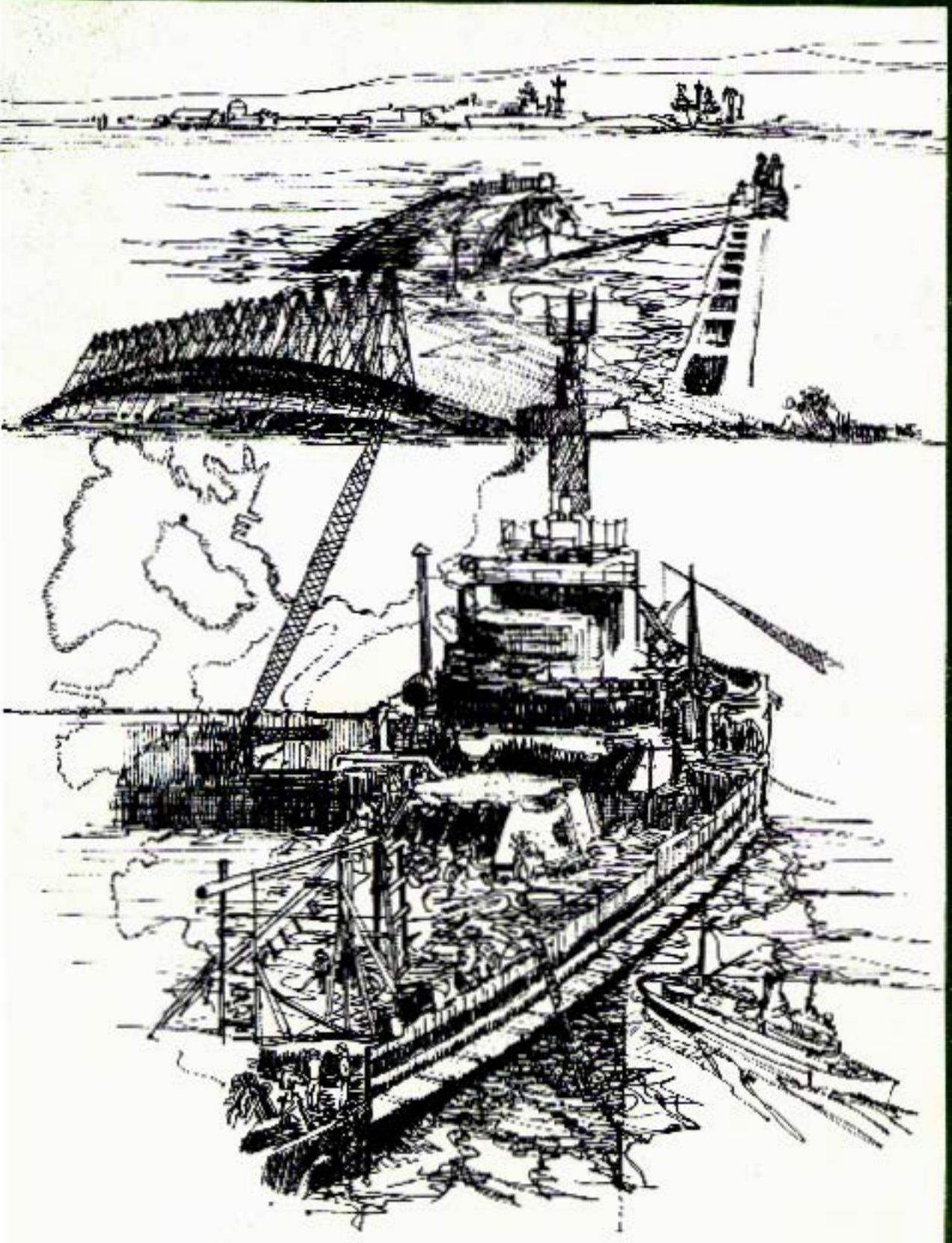
FACEPLATE

The Official Magazine for the Divers and Salvors of the United States Navy



The History of Navy Salvage

SPRING 1984
Volume 15, No. 1

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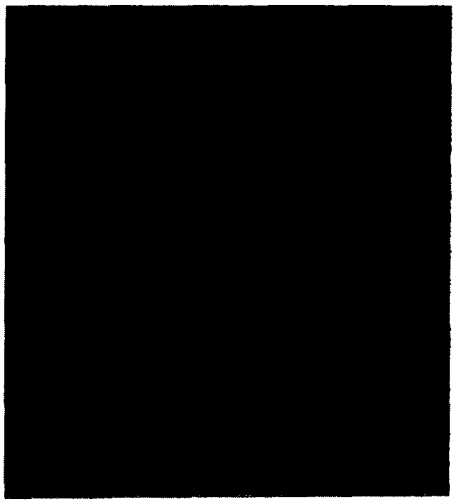
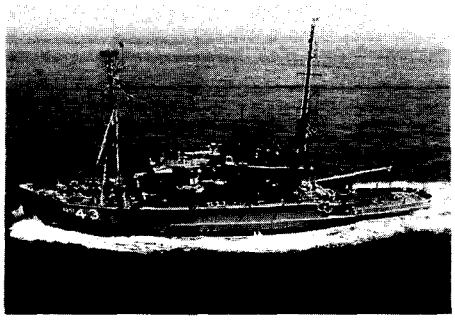
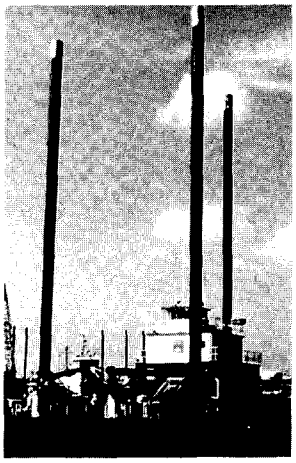


Page 11



Page 16



Page 22

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SOUNDINGS

The Man Responsible for Fleet Salvage at Pearl Harbor Dies at 90

ADM Homer N. Wallin, USN (Ret.), the man in charge of raising and repairing the ships sunk during the Japanese attack on Pearl Harbor 7 December 1941, died 6 March 1984 at age 90.

ADM Wallin's long and distinguished military career began in 1917 with his graduation from the Naval Academy, and included service in three wars before his retirement in 1955.

Following World War I, ADM Wallin did postgraduate studies in Naval Architecture and Marine Engineering. During his tenure in the Navy he served as Material Officer of the Battle Force and Salvage Officer of the Pacific Fleet. He also commanded the Naval Shipyards at Philadelphia and Norfolk. ADM Wallin became Chief of the Bureau of Ships during the Korean War, and at the time of his retirement, he was the Commander of the Puget Sound Naval Shipyard, Bremerton, Washington. Following retirement, he continued to use his marine engineering expertise at the Puget Sound Bridge and Drydock Company, as a consultant to shipyards.

Throughout his career, ADM Wallin was commended for outstanding service. He received the Distinguished Service Medal for his work at Pearl Harbor, the Legion of Merit for service in the South Pacific and numerous other military citations. His book, entitled "Pearl Harbor, Why and How," is considered an authoritative work on the subject of the salvage operations there.

On Pearl Harbor Day, ADM Wallin was with the Battle Force Command aboard the battleship CALIFORNIA. In a 1981 interview, he described that morning. "I went right out to my ship which was listing about nine degrees from damage done by several torpedo hits. From my station on the flag bridge, I could see oil fires approaching, being blown by a north wind." He and his crew were forced to abandon the ship, which sank three days later. However, due to the ingenuity and strenuous efforts of ADM Wallin and his Pearl Harbor personnel, the ship was salvaged in April 1942.

CAPT Wallin during salvage operations at Pearl Harbor, 1942.

Immediately after the attack on Pearl Harbor, (then) CAPT Wallin was appointed Fleet Salvage Officer, the man with full responsibility for the restoration of order and the recovery from losses the U.S. had suffered. The task seemed overwhelming. Wallin states in "Rejuvenation at Pearl Harbor," an article he published in *Naval Institute Proceedings,* that nine ships were sunk and ten others were severely damaged. When the President gave a radio address to the American people in February 1942, the amount of recovery he anticipated seemed unrealistically large. Several months later, however, it was clear that the salvage work had proceeded so well that even more assets were recovered than the President had expected. ADM Wallin was credited with this success and for the rapid repair of ships for their return to the line.

ADM Wallin describes the October 1944 Battle at Surigao Straight in "Rejuvenation at Pearl Harbor." During this battle, a segment of the American Seventh Fleet, composed almost entirely of ships salvaged from Pearl Harbor, destroyed the southern prong of the Japanese Fleet. He states that, "It was a matter of great satisfaction to many Americans, and it must have been a bitter pill for the Japanese, to realize that five of the six battleships of the force which thus polished off the Sons of Heaven had been damaged at Pearl Harbor on December 7, 1941."

ADM Wallin's intelligence, optimism and diligent salvage work were significant in enabling the U.S. Navy to remain strong throughout World War II and for many years afterward.

Divers Evaluate MK 16 Underwater Breathing Apparatus Decompression Procedures

Twenty-one Explosive Ordance Disposal divers, ten from Group ONE, five from Group TWO, six from the Naval School, Explosive Ordance Disposal; twelve divers from Army Special Forces; and fourteen divers from the Navy Experimental Diving Unit participated in a series of dives to validate constant partial pressure from oxygen and helium decompression tables for use with the MK 16 Underwater Breathing Apparatus. The evaluation was conducted 2-27 April 1984 at the NEDU, Panama City, Florida. The MK 16 is a mixed-gas closed-circuit UBA with low magnetic and acoustic influence used primarily for mine countermeasure diving.

The decompression tables developed for the MK 16 are the result of the most exhaustive table development series ever conducted at NEDU. The apparatus will be for use to a maximum depth of 300 feet using helium-oxygen (HeO_2). This series also successfully evaluated emergency air decompression procedures for the MK 16 HeO_2 tables.

New Training Program for EOD Assistants

On 21 March 1984, the first class of Explosive Ordnance Disposal Assistants (5331) graduated from the Naval School, Explosive Ordnance Disposal (NAVSCOLEOD) in Indian Head, Maryland. Eight students completed the six-week course. They had already received basic SCUBA training at the Naval Diving and Salvage Training Center, Panama City, Florida, and chemical and biological ordnance training at the U.S. Army Missile and Munitions Center and School, Huntsville, Alabama.

All divers in this new program attend courses in EOD tool sets, basic demolition, basic EOD ordnance identification

and EOD publications. While they learn some recovery methods, they are not taught render safe procedures. Following the course, students ranked E4 and below are sent into the Fleet for two years of hands-on experience. They may then return to NAVSCOLEOD for the 5332 EOD technicians course, where they will learn render safe procedures.

Before this new program was developed, SCUBA divers were recruited for the EOD fourth man diver program, where they received basic instruction on the job. LCDR Carroll Bernier, Division Officer of Underwater Ordnance at the EOD School, believes that this new program will produce a better trained and prepared EOD assistant.

HM2 Kevin Dean adjusts the air control valve on the MK V in preparation for its last dive.

Last Class of Copper and Brass

16 December 1983 marked the end of an era. On that day, 13 students of Class 83007 graduated from LANTFLT Second Class Diving Training conducted by Mobile Diving and Salvage Unit TWO. This class of Navy divers was the last to be trained using the MK V "Deep Sea" diving rig. The MK V has been replaced in MDSU TWO's curriculum by the MK XII Surface Supported Diving System (SSDS). In spite of the many improvements the MK XII SSDS brought to Navy diving, and although the memory of the MK V will fade as new generations of divers enter the Fleet without training for it, the "old hard hatters" will continue to remember with fondness their initiations to "basic barge" with the "spun copper helmets sitting on their shoulders."

MDSU-TWO, DET 304 Conducts Drill Weekend at Barnegat Light

During their normally scheduled drill weekend on 5-6 November 1983, the officers and enlisted men of Naval Reserve Mobile Diving and Salvage Unit TWO, Detachment 304, participated in a training evaluation and diving operation. They coordinated their manpower resources and hardware with those of the 150th Aviation Battalion of the Delaware National Guard and the U.S. Coast Guard. The three organizations conducted a weekend diving operation at the U.S. Coast Guard Station, Barnegat Light, New Jersey. "We wanted to test our ability to work cooperatively with other military services while increasing our overall mobilization readiness," stated the unit's Commanding Officer, CDR Pete Krech.

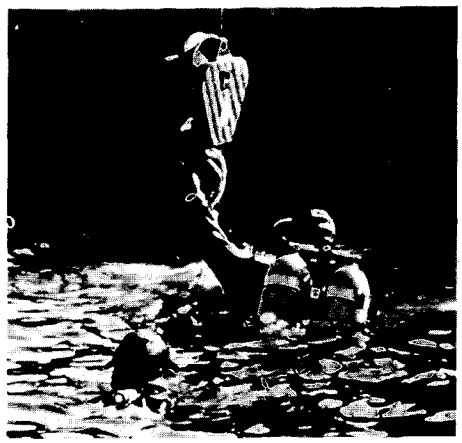
On Saturday morning, 5 November, eight Delaware National Guard helicopters flew the divers from Naval Base Philadelphia to Coast Guard Station Barnegat Light. Twenty-nine DET 304 divers and support personnel made the trip. After an arrival briefing, DET 304 split into three pre-determined operational dive teams.

Team One proceeded to Coast Guard Station Beach Haven, at the southern end of Long Beach Island, and conducted underwater pier and seawall inspections as well as hull inspections on the Coast Guard vessels there. Team Two remained at Station Barnegat Light and conducted similar inspections on the piers and patrol craft based there. Team Three participated with Coast Guard personnel on a Coast Guard boat to salvage a sunken pleasure craft.

On Sunday morning, 6 November, the unfinished diving operations were completed and reports concerning the results of the underwater inspections conducted the previous day were finalized. After the appropriate time delay, the helicopters from the Delaware National Guard loaded personnel and equipment and flew in formation back to Philadelphia.

During the weekend, divers and support personnel received excellent hands-on training. At the same time, they provided useful diving services to the Coast Guard. All divers were utilized in the operation and their equipment functioned satisfactorily and safely.

The parties involved in the operation learned from each other. The team spirit



MDSU Two divers assist in recovering a sunken craft.

demonstrated during this operation will carry over to future operations.

Mobile Diving and Salvage Unit TWO, Detachment 304, based at the Naval Reserve Center, Naval Base, Philadelphia, consists of 27 officers and enlisted divers and 17 support personnel.

USS RECOVERY Sets Standards for Excellence

The USS RECOVERY, a 37-year-old diving and salvage ship, earned all the Service Squadron EIGHT departmental awards in 1983. These included the Blue Supply "E" Award, the Damage Control Award, the Green Communications "C" Award, the Navigation Award, the Engineering Golden "E," the Retention "R" and the Battle "E." The Battle "E" was awarded to the RECOVERY for the second consecutive competitive cycle, which included RECOVERY's six month forward deployment to the Mediterranean and three months of operations in the Caribbean.

In addition to the Service Squadron EIGHT awards, during 1983 the RECOVERY became the first U.S. Navy diesel propelled ship to successfully complete an Operational Propulsion Plant Examination.

Individual crew members demonstrated outstanding abilities and service as well. Among the approximately 100 men on the RECOVERY, over 150 medals and letters of commendation and appreciation have been received in the last nine months.

The USS RECOVERY is commanded by LCDR Robert P. Brittingham, USN. The ship is attached to Commander Service Squadron EIGHT, and is homeported at the Naval Amphibious Base, Little Creek, Norfolk, Virginia.

New Ocean Systems Test Facility at NCEL

The new Ocean Systems Testing Facility (OSTF), a 1,200 square foot instrumentation and testing area at the Naval Civil Engineering Laboratory (NCEL), Port Hueneme, California was dedicated on 2 February 1984.

NCEL's Commanding Officer, CAPT N.D. Falk, described the OSTF. "It features a 70,000 gallon outdoor seawater tank which is 12 feet deep and 30 feet in diameter. It also includes an observation bay; instrumentation room; assembly and maintenance area for tools and test equipment; electronics room for preparing sensors, transducers and video cameras for underwater operations; diving equipment storage area; and a supply tank maintenance room. A bridge crane, capable of lifting 4,000 pounds, spans the tank to position test equipment in the water."

The facility will provide badly needed space and capabilities for developing and testing underwater diving tools and associated power systems. Personnel are now able to conduct several operations at a time. With three computers, test results can be analyzed while tests are being conducted. The computers will also monitor tool performance and conduct human factor analyses.

Ron Brackett, NCEL's project coordinator for test tank operations, explained that three portholes were built into the new tank, enabling non-diving engineers to observe and inspect their projects during testing. Navy underwater construction teams use the tank to instruct divers in handling hydraulic tools, equipment and power supplies.

RADM W.M. Zobel, Commander, Naval Facilities Engineering Command, observes as a Navy diver operates a seawater hydraulic grinder.

At present, six major projects and programs are being planned for the facility. They are Underwater Ultrasonic Metal Thickness Measurement, Inspection of Wooden Waterfront Structural Members, Underwater Maintenance and Repair Technology, Seawater Hydraulics, Tools for Saturation Diving, and Diver Electrical Safety.

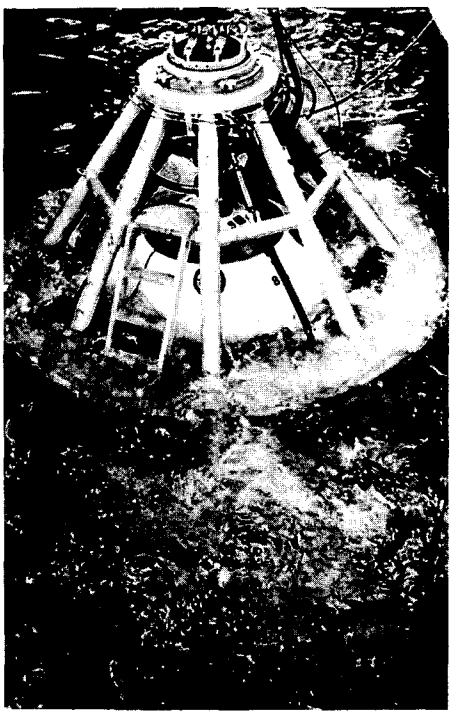
Since 1968, NCEL has provided the Navy with diverse equipment and services. With the new facility, more precise and efficient testing is expected.

ANU Of Underwater Cleaning System

The Naval Civil Engineering Laboratory (NCEL) Flow Industries Model 12DS Jet Pac, a high-pressure underwater cleaning system, has been Authorized for Navy Use (ANU). The system will be listed in the next issue of 9597.1A, a publication of diving equipments which are service-approved or authorized for Navy use.

The system has a working pressure of 10,000 psi, a maximum flow rate of 5 gpm and can be operated in fresh or salt water. Divers are required to wear 1/4 inch neoprene wet suit hoods when using this tool. The maximum permissible operating time during a 24 hour period is 2 hours and 45 minutes per diver.

If you would like more information, or if you are interested in purchasing the Flow Industries Model 12DS Jet Pac, contact Ron Erich at NCEL (AV 360-5487) or Eric Lindberg at NAVSEA OOC (AV 222-7403).



Personnel transfer capsule on the ORTOLON.

USS Ortolan Completes Saturation Dives

In November 1983, USS ORTOLAN made two 850-foot saturation dives. They were the first for this Charleston-based Submarine Rescue Ship. The ORTOLAN finished a long series of certification requirements on its deep-diving system during October and November. These two successful dives were needed to complete the certification process.

"We have finally proven all five subsystems can work safely under all conditions," said the ship's commanding officer, CDR Jeffrey Babetz. These subsystems include a McCann Submarine Rescue Chamber; a weight handling system with a bridge crane to launch personnel transfer capsules and rescue vehicles; a surface-supplied diving system; and two saturation diving complexes. Certification of the ship required that all these components be certified simultaneously.

The five-man crews were initially pressurized to 850-foot depths in a deck decompression chamber. This began the process by which their body tissues became completely saturated with the helium-oxygen breathing medium. "The chamber provides sleeping spaces, a work area and sanitary facilities," explained LT Patrick Rolow, diving officer during qualifications and now executive officer of the Long Beach fleet tug, USS MOCTOBI.

During the tests, divers wore the MK 1 Mod S saturation mask. Following the dives, decompression to atmospheric pressure took approximately ten days.

Since the dives, LT Steve Cody has assumed the responsibilities of deep submergence officer. He will supervise continuing diving operations on board ORTOLAN and is responsible for maintaining the system certification that was issued on 6 April 1984.

Team members for the first 850-foot dive were HT1 (DV) Ephriam Lopez, HTC (DV) Alan Easton, HT1 (DV) David Lands, HTC (DV) Martin Krepp and BMC (DV) Allan Paauwe, team leader.

Team members for the second dive were EMC (DV) Thomas Ostertag, GMGC (DV) William Brooks, HTC (DV) David Willette, MR1 (DV) Tom Fedock and HT1 (DV) Peter Gronbeck.

View from the SUPERVISOR OF DIVING

CDR Raymond Swanson

Recently, in a discussion concerning the economics of diving, I was asked two questions: "What equipment has the Supervisor of Diving provided to the Fleet?" and "Is the diver worth that expenditure?" A little background information may surprise you and give you a better understanding of your worth as a Navy diver.

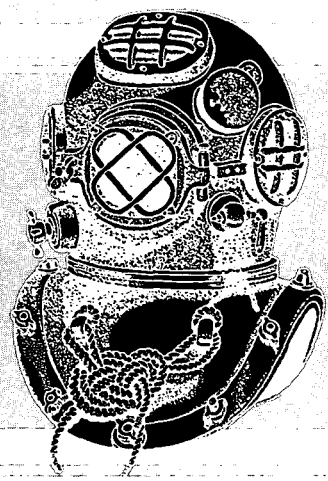
From 1978 to 1983, the Supervisor of Diving (NAVSEA OOC-3), under the Director of Ocean Engineering (NAVSEA OOC), provided approximately 59.2 million dollars of diving equipment to the Fleet. This is for hardware only, and does not include services provided in support of Fleet diving by the Navy Experimental Diving Unit, the Naval Medical Research Institute, or the various Naval laboratories which perform work for the Supervisor of Diving. A partial listing of equipment provided to diving activities during this period includes:

MK 12 SSDS
MK 15
Portable Recompression Chamber
Two lock chamber
R.O.P.E.R. Cart
H.P. Compressors
L.P. Compressors
Hardwire Communications
Diver Helmet Mounted Television (DHMTV)
Hydraulic Tools
Life Vests
Draeger LAR V SCUBA
Gas Transfer System
Suitcase Console

Also, the MK 12 Mixed Gas Recirculator and the MK 16 Low Influence SCUBA are under contract for future delivery. The Standard Diving Boat is once again in progress after contractor default.

Since there are approximately 3,000 divers (this number does not include SCUBA Diver NEC 5345) in assigned billets throughout the Navy, simple mathematics shows that the Office of the Supervisor of Diving spent approximately $3,300 per year per diver for equipment.

If we add another 38.5 million dollars for the construction of the Navy Experimental Diving Unit, the Naval Medical Research Institute's hyperbaric facility and the Navy Diving and Salvage Training Center, plus 1.5 million dollars per year for funding various engineering work, tests, evaluations and certification in support of Fleet operations, we get a more accurate picture of the support provided by the Supervisor of Diving. Now the big question: Is the diver worth it?



To answer the question, both tangible and intangible values must be considered. The intangible cost savings are closely related, but not limited to, the Special Warfare and Explosive Ordnance Disposal diver's mission. These two communities function as a deterrent against aggression and terrorists, or as an insurance policy against possible damage by ordnance. We recently witnessed examples of both in the cases of Grenada and the Greek tanker which was hit by a missile in the Persian Gulf.

In addition, Fleet divers are frequently called upon to support other federal agencies. Values cannot be placed on the potential cost involved in these areas; but, as you can see, it could involve millions of dollars.

Tangible cost savings are more important to the Fleet. During the six year period mentioned earlier, Navy divers performed 465,500 dives, 235,200 of which were working dives. The Pacific Fleet indicated that in 1982, the work performed by Navy divers resulted in cost avoidance of 20 million dollars. Assuming the same value to be true for the Atlantic Fleet, 40 million dollars in annual savings to the Navy results. This should be a conservative estimate, since a fair portion of dives was neither evaluated for cost savings, nor done for the Atlantic and Pacific Fleets; therefore, these dives were not included in the above statistics. Using this figure of 40 million dollars in savings per year, each diver substantially reduces costs to the Navy, making the trade-off well worth it.

The above discussion used rough values and did not consider all factors, such as training costs and special pay. But it still provides you with some concrete values to measure your contribution to military economics.

But don't stop there. Many people are aware we exist but have no idea what services we provide on a day-to-day basis. Your job, without appearing to be boasting, is to enlighten those around you. Make them aware of your contributions to ships' husbandry, salvage, etc.

It is important we find ways to accomplish more work underwater — this is our bread and butter. Never refuse a job that is within your capability to accomplish, and any job you do — do well. Do it better than it can be done on the surface. Show pride in your ability to do underwater work and in yourself as a Navy diver.

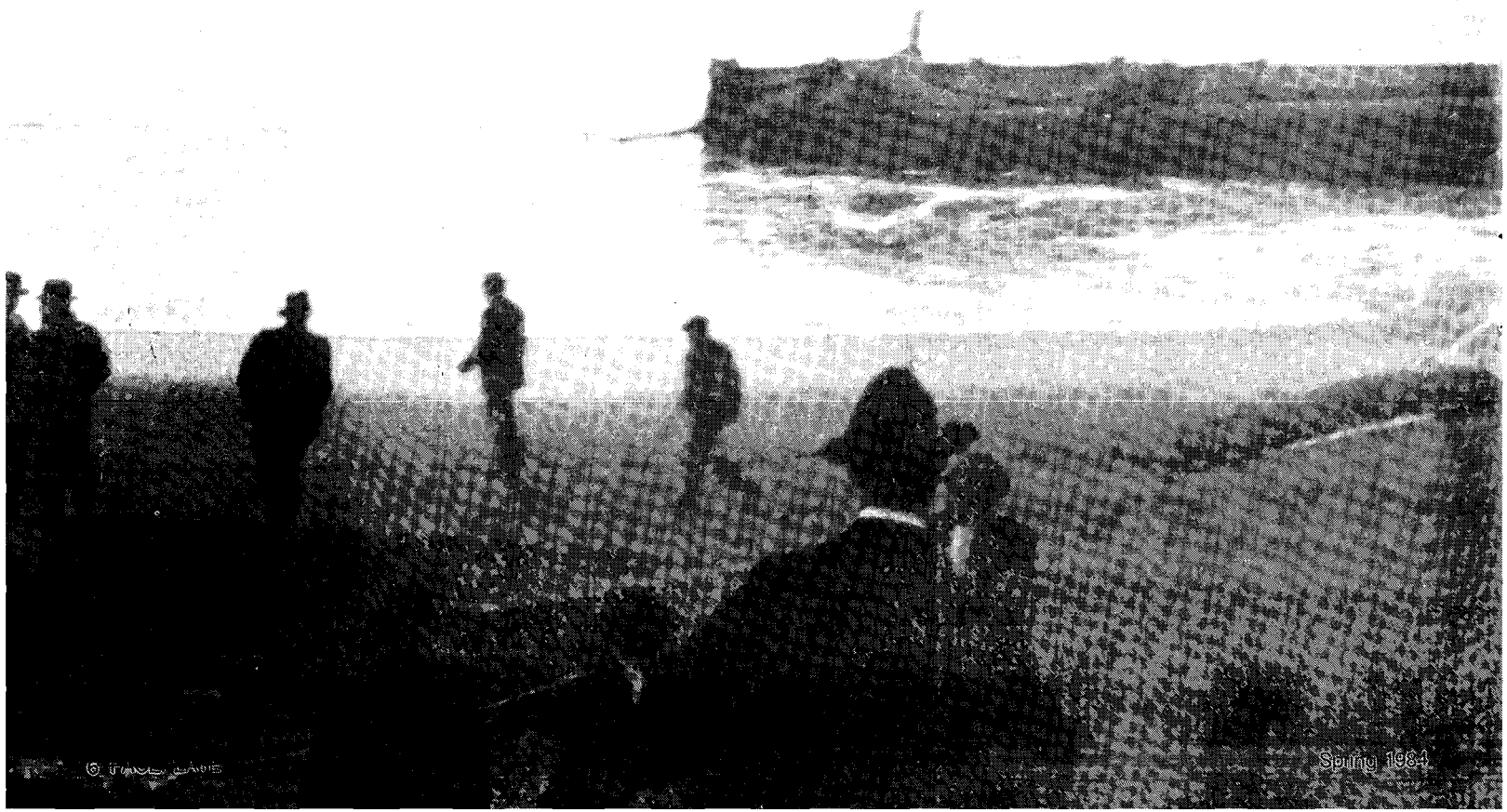
Is the diver worth it? I offer an unqualified YES!

The HISTORY of NAVAL SALVAGE

Editor's Note: This account, written by one of the pioneers of Navy Salvage, informs us of the technical, political and financial beginnings of Navy Salvage. In 1938, RADM Sullivan was ordered to become familiar with the methods and techniques used by commercial salvors in their offshore work as well as to examine why the industry could not be profitable financially. This investigation, and Rear Admiral Sullivan's own experience, are the foundations for the following article.

RADM Sullivan obtained the material concerning events prior to 1938 in conversations with RADM Henry Williams, RADM Julius Furer and CAPT Lewis McBride of the Navy, Mr. Warren McLaine, Admiralty Counselor to the Navy, and Mr. Thomas Scott of the Merritt-Chapman and Scott Salvage Corporation. He extracted other information from Navy correspondence, salvage reports and journals, and material located in the files at the School of Oral History, Columbia University.

RADM William A. Sullivan, USN (Ret.)



The USS H-3 ashore near Eureka, California, 1917. The USS Milwaukee (background) was grounded and destroyed by breakers while trying to pull the submarine off.

Early Salvage

From the early days of sailing vessels, until the late 1800s, salvage companies flourished. Coastline strandings occurred frequently, because navigational aids were primitive, and generally, ships' crews lacked sufficient training. Therefore, salvors were constantly busy. At the same time, the process used to free a stranded vessel was not complicated with the need for expensive salvage equipment. These factors worked together to make ship salvage a profitable venture.

While the work required to refloat a stranded sailing ship was not difficult, it was urgent. Every seaport had at least one salvage ship ready at all times to speed to the aid of a nearby offshore casualty. Large seaports generally had several. Salvors rushed to a stranded vessel to secure it as quickly as possible so that it could not creep further ashore under the influence of wind and sea. Heavy anchors were planted in good holding ground offshore and secured to the wreck by hawsers. These would hold the ship in place until heavy cargo was removed and the ship could be refloated on a rising tide.

Salvors needed to provide little equipment. Sailing ships were fitted with anchors very suitable for the work of making them secure until they could be refloated. The ships also carried heavy hawsers and purchase gear to develop the required strain in the hawsers. The only equipment required of salvors was a work boat in the event that the ship aground did not have a boat capable of taking the anchor out to a good location offshore.

Because sailors at that time often had little knowledge of the technical implications of their immediate situations, the most significant help the salvor could provide was the service of a Salvage Master, an experienced master mariner, who knew ships and the characteristics of the prevailing winds, tides and currents. With his background, he could lead his own crew and the sailors aboard the stranded ship to a successful rescue operation. The salvage crew's primary responsibilities were manual operation of the windlass to develop maximum strain in the cables, unloading cargo to lighten the ship, and removing the cargo to a safe place, either with another vessel or their own.

New Forms of Transportation

In the mid-1800s, with the construction of railways and highways, fewer of the nation's transport needs were satisfied by waterborne carriers. The number of ships operating in our coastal waters diminished. Simultaneously, steamships began to replace sailing vessels, and complications in refloating these new craft were numerous. Navigational aids were improved and sailors became more experienced and technically qualified for their work. Therefore, the number of casualties occurring along the coasts was sharply reduced.

While fewer salvage jobs were being performed, the salvage of a stranded steamship was much more difficult and costly than refloating sailing vessels. This was due to the fact that salvors needed expensive equipment to complete their work. Salvage anchors were now provided because the self hawsing anchors carried by steamships were not suitable for salvage. The salvor also needed large diameter hawsers and heavy purchase gear, as such cable and fittings were rarely available on a steamer. In addition, a stranded ship with a flooded fire room would require steam for its winches. Hence, a donkey boiler was required.

The new steamships were heavier than their sailing predecessors. It was unlikely that a steamer hard aground would come afloat on a rising tide because it was fitted with machinery that could not be removed to reduce weight. Beach gear would often be required to retract the ship. Consequently, the salvor needed to provide still more salvage anchors and heavier hawsers. If hulls were flooded, dewatering would be necessary to lighten the ship. Salvors

therefore supplied water pumps and divers to patch leaks in the hull.

For salvors, what had once been steady and relatively simple work was now encumbered with difficulties and uncertainty.

Financial Difficulties for Salvors

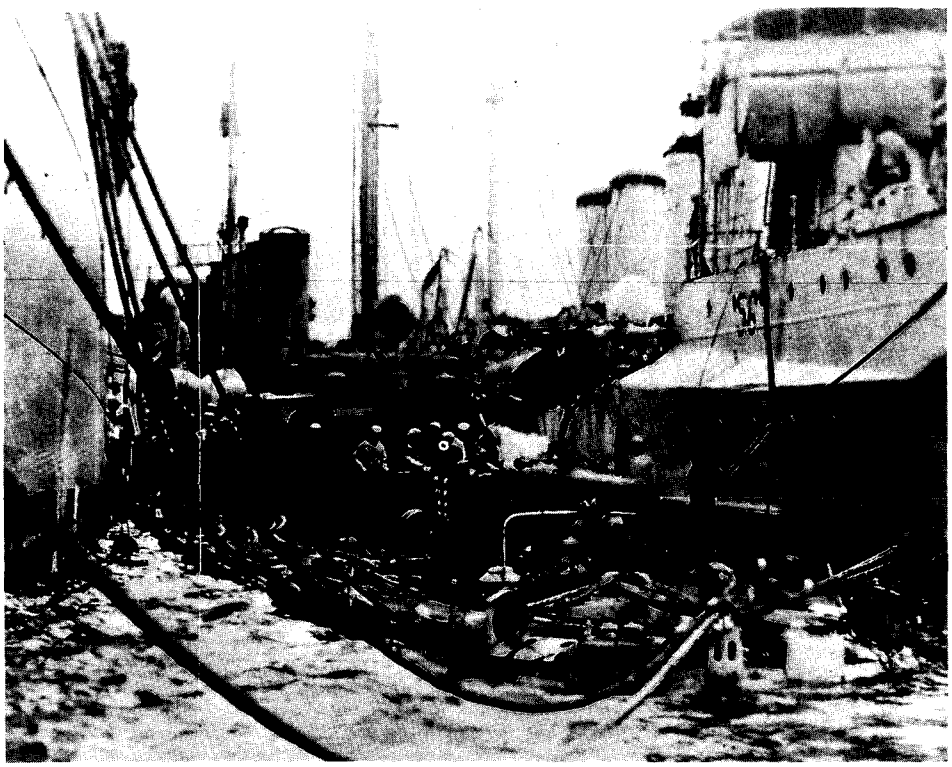
By 1900, use of the ocean for transport had diminished significantly. With fewer casualties and more expensive and complicated salvage methods, the salvage companies that had thrived just a few years earlier now faced financial difficulties. Many went out of business; some merged with other groups in an attempt to form larger and more financially capable companies. At that time, however, the changes in the salvage business did not have a significant impact on the Navy.

The cost of completing an average salvage job increased greatly. Although salved values of ships and their cargoes were also greater, salvors were making less profit in their work. The courts increased the percentage of salved values in awards for refloating strandings, but only very slightly.

As the years went by, companies maintaining large salvage facilities along the coast disappeared. By 1914, when World War I began, only three companies — Yankee Salvor of Boston; Merritt and Chapman of New York; and T.A. Scott of New London, Connecticut — maintained ships in a ready condition to aid casualties occurring along the Eastern Seaboard.

At this time, U.S. Navy officials appeared content with the capabilities of the surviving salvage companies on the Atlantic and Pacific Coasts. The Navy Bureau of Construction and Repair and the Bureau of Ships administered annual contracts with these companies, assuring immediate availability of services. These contracts were conducted on a "no cure-no pay" basis, which provided salvors a percentage of the value of successfully salvaged ships and cargoes. Although the contracts could be costly, this expense during peacetime was lower than that of maintaining large supplies of equipment and training Navy salvors.

In addition, Naval ships were in the hands of competent officers with well-trained crews. They seldom became casualties, particularly offshore, where attention was needed as quickly as possible. The change in the salvage industry did not have immediate consequences for the Navy.



After being rammed by HMS ZENNIA during World War I, USS BENHAM is salvaged by ZENNIA and USS ERICSSON.

World War I

It was during and shortly after World War I that attention was drawn to the fact that existing U.S. national salvage capabilities were inadequate for wartime demands. Personnel from U.S. salvage companies were sent to Europe to assist in refloating damaged merchant ships. They returned unable to agree about ways to continue.

In 1917, the British government requested that the U.S. send two salvage vessels to work with them in refloating merchant ships off the coast of France. The British ships were privately owned and carried civilian crews. However, their work was coordinated by an Admiralty Salvage Department which had been created to meet wartime needs.

Upon receipt of the British request, the Bureau of Ships forwarded it to the three salvage companies operating in the U.S. None considered that they could take the financial risk. Consequently, the request was sent to the Navy. Franklin D. Roosevelt, then Assistant Secretary, agreed that the Navy would assist the British.

Roosevelt arranged to claim one ship from T.A. Scott and another from Merritt and Chapman. He manned the two ships with Naval Reserve personnel experienced in offshore salvage. He then arranged for the Navy to rent salvage equipment sufficient to outfit the two ships for the European assignment. The ships departed under the direction of Walter Davis, manager of the offshore division of Merritt and Chapman, and Harold Witherspoon, one of the owners of the Yankee Salvors, both Naval Reserve commanders. T.A. Scott of New London, also commissioned as a Commander in the Naval Reserve, remained in the U.S. as an assistant for salvage affairs to Roosevelt.

The two U.S. ships joined the British on the French Coast shortly before hostilities ended. The combined British and American effort resulted in significant savings of money and cargo.

After the war, the British Admiralty deactivated its salvage department and their privately owned salvage vessels returned to England for more profitable employment.

The American ships returned to New York. The Navy dismantled their crews and attempted to return the ships and rented salvage gear to their respective owners. Disputes quickly erupted.

Merritt-Chapman and Scott

Disagreements concerning the condition of the equipment used for the

World War I salvage operations broke out between the civilian salvors and the Navy. When it appeared that the fighting would not be resolved outside the courts, Roosevelt intervened and the Merritt-Chapman and Scott Salvage Corporation was created.

Roosevelt invited Chapman and Scott to meet with him, and spoke about the future of the salvage industry. He was aware that none of the three companies had been making adequate profits recently and prospects for their futures were dubious unless changes were made at once.

The salvage industry was attempting to survive under difficult circumstances. New steamships were better built, carried more cargo and were more efficient than before. The ships were crewed by better trained personnel, and carried greatly improved navigational aids. All ships had radios, which could provide weather advice.

Roosevelt said he was convinced that the number of casualties occurring each year would be greatly reduced. In addition, salvors would find their work more difficult, because ships were larger than they used to be and were likely to be traveling faster when running aground, causing more extensive damages. He anticipated that there would not be enough work to justify the operation of three companies.

To prevent large financial losses, Roosevelt proposed that the three companies devise a plan for consolidating their resources. Though the industry was facing a crisis, it was his belief that one company, with a monopoly over all salvage work, could be profitable. He recommended that compensation agreements for salvage jobs remain "no cure-no pay." All concerned parties—the salvage industry, ship owners, shipping underwriters, the government and the general public—were likely to be satisfied with such a system.

It was becoming increasingly clear to Roosevelt that the Navy had an interest in the viability of salvage companies. Navy officials were reluctant to acquire large stores of expensive and seldom-used equipment, so they relied heavily on commercial salvors for all but submarine salvage. Roosevelt therefore assured Scott and Chapman of government assistance as the company reorganized.

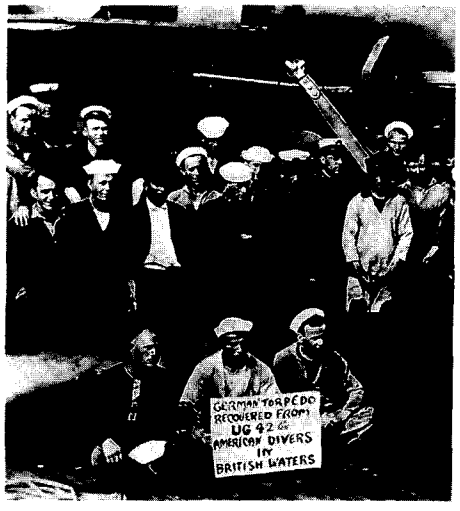
First, the Navy would provide the new company with ships. Following the war, the Navy had a surplus of Bird Class minesweepers, which were considered excellent for conversion to salvage craft. Some were in commission, and others were not yet completed. A number of these minesweepers were still on the launching ways and were scheduled to be cut up for scrap.

Roosevelt proposed that these uncompleted ships, and the machinery that would have been installed in them, be sold for the estimated cost of the scrap obtained, less the estimated cost of cutting the ships up for scrap.

Scott and Chapman agreed to implement Roosevelt's suggestions. The companies merged, bought the minesweepers and in 1918, the Merritt-Chapman and Scott Salvage Corporation was established.

The Navy, through the Bureau of Construction and Repair, contracted with the new company. Legally, the Bureau could make such arrangements with a private contractor. However, it had no responsibility for any salvage work done by uniformed personnel. Merritt-Chapman and Scott agreed to send help at once to any Navy ship in distress in U.S. Coastal waters.

The newly formed company commenced operation with four converted Bird Class ships stationed along the Atlantic Coast and another in the Pacific. A British ship was stationed at Kingston, Jamaica to cover the Caribbean. Salvage depots with reserve salvage gear and shop facilities to repair damaged gear were maintained at New London, Connecticut; Staten Island, New York; Key West, Florida; Kingston, Jamaica; and Los Angeles, California.



U.S. Navy divers pose with a torpedo recovered off Cork from the German submarine SMS UC-42, 1917.

For the next 18 years, the Navy depended entirely on Merritt-Chapman and Scott for salvage work.

The Years After World War I

Following World War I, a tremendous pacifist movement swept across the country, and it had a profound effect on the development of all Naval operations. The Washington Naval Limitation Treaties placed restrictions on numbers and sizes of ships leading navies could retain. As a result, many of our ships were sent to scrap yards, including most of those not yet completed. So drastically were annual appropriations reduced that our Navy struggled simply to maintain in commission the ships permitted under the treaties.

During that time, shipbuilding yards closed, and facilities for ship repair began to deteriorate. Ship designers, naval architects, mechanical engineers and draftsmen lost their jobs and drifted off to other work as did shipyard electricians and workers skilled in shipbuilding.

When Franklin Roosevelt became president in 1933, he found our Navy significantly weaker than foreign navies. Most of the front line ships had been in service in World War I. Some were already considered obsolete. There were fewer ships than the treaty permitted.

Roosevelt convinced Congress to increase appropriations for repairs and modernization on existing ships. He also authorized the construction of a huge two-ocean Navy. Ultimately, we would again have a powerful Fleet. However, it would take time to fit out new ships and provide trained personnel for their operation.

At the same time the U.S. military was being revived, the Japanese were becoming increasingly aggressive. In response to this, the administration positioned the Navy's most powerful units in Southern California ports in preparation for an outbreak of fighting.

1938

In 1938, a crisis developed when Merritt-Chapman and Scott notified the Bureau of Construction and Repair that it was no longer financially feasible for them to furnish salvage assistance to Naval Ships in Pacific waters. Mr. Scott explained that the company had suffered financial losses every year it had conducted salvage operations in the Pacific. He intended to close its salvage depot in Los Angeles and move the ship

stationed there to the Atlantic to replace a ship recently lost at sea.

With the Japanese threat in the Pacific, the Navy's strongest ships positioned there and the potential for war in Europe, Merritt-Chapman and Scott's decision was particularly alarming to Navy officials. CAPT Henry Williams, Assistant Constructor at the Bureau, realized that Merritt-Chapman and Scott's decision to abandon offshore salvage operations in the Pacific would leave all Naval ships on our West Coast with no salvage protection. No other company on the West Coast had facilities or competent personnel to undertake such work. A strong Fleet and adequate salvage protection were desperately needed, and the U.S. had neither. It was time for the Navy to intervene.

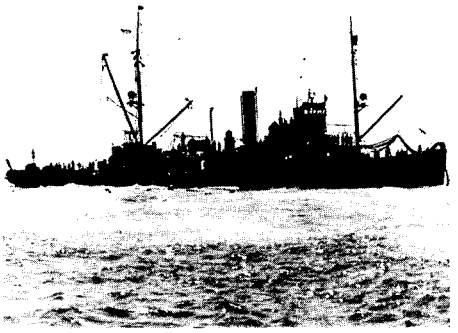
Naval officials attempted to convince Merritt-Chapman and Scott to reconsider, but all attempts at negotiation failed.

After much deliberation, it was decided that the Navy should use its available resources to establish a salvage operation on the West Coast. Following Merritt-Chapman and Scott's withdrawal, the Navy purchased their equipment and stored it at a newly established Naval Salvage Base in San Diego. This gear would be loaded onto Navy tugs and minesweepers as required. Any available salvage personnel would be recruited as needed.

LCDR (later RADM) William Sullivan was assigned to the position of Commanding Officer at the Naval Salvage Base. His background in Naval engineering, his work in salvage operations, both in China and the United States, and a demonstrated ability to solve salvage problems, made him an ideal candidate for the position.

The complications in establishing a Navy salvage operation were many. First, the Bureau of Construction and Repair had so little information about offshore salvage work that it was unable to provide CNO or the Secretary of the Navy with adequate technical background on the subject. So well had Merritt-Chapman and Scott been dealing with salvage work over the years that the Bureau had not collected any information.

There was also difficulty in locating available personnel. The list of officers enrolled in the Naval Reserve, but not on active duty, was studied to see if anybody might be qualified for such work. Officials even considered recalling to active duty some of the salvage officers in the Naval Reserve on duty in World War I. Few such personnel existed and those still living were too old for the demands of the job.



The USS FALCON - a Bird Class minesweeper converted to a Submarine Rescue Ship.

In order to learn more about salvage technology and to anticipate some of the difficulties the Navy might experience in instituting its own salvage service, (then) LCDR Sullivan examined the salvage problems peculiar to the West Coast which had resulted in Merritt-Chapman and Scott's failure to make a profit there.

LCDR Sullivan learned that the narrow strip of continental shelf off the coast caused a heavy ground swell and a surf which extends further offshore than elsewhere. He outlined the surf's action on grounded ships and proposed methods and equipment for dealing with the resulting difficulties. He also provided a detailed inventory of existing equipment that could be used for salvage along the coast, and proposed means of transporting it to various locations offshore. His study provided information for the improvised salvage operations the Navy was preparing to undertake.

This research provided a foundation for developing a salvage contingency plan on the West Coast. However, as international tensions increased, it became clear that the Navy must build a salvage organization capable of handling wartime demands of a much larger magnitude.

To examine this larger issue, (then) CDR Sullivan was ordered to England by the Chief of Naval Operations in October 1940, this time to study salvage problems on a wartime scale. His investigation revealed that it was a lack of trained personnel, salvage ships and equipment, rather than technical difficulties, which had been troublesome to the British Admiralty during this war. Prior to the war, the British Navy had relied on private companies for salvage work. With the outbreak of war, it became necessary for the Admiralty to take control of these commercial firms and utilize them for wartime operations. The British situation was parallel to our own. Their solution offered the U.S. Navy a means of alleviating our shortage of ships, facilities and personnel.

Upon his return to the United States, CDR Sullivan was ordered to duty with the Bureau of Ships. He reported that the only salvage facilities in the United States capable of offshore operations on large craft were those of Merritt-Chapman and Scott. Their five ships on the Atlantic Coast represented the sum of salvage protection in the U.S. These, Sullivan believed, were totally inadequate for the demands of war.

The Bureau of Ships recommended the execution of a contract with Merritt-Chapman and Scott, under which the Navy would control the company's ships, bases, equipment and assignments. The company would, however, be permitted to operate in their usual fashion.

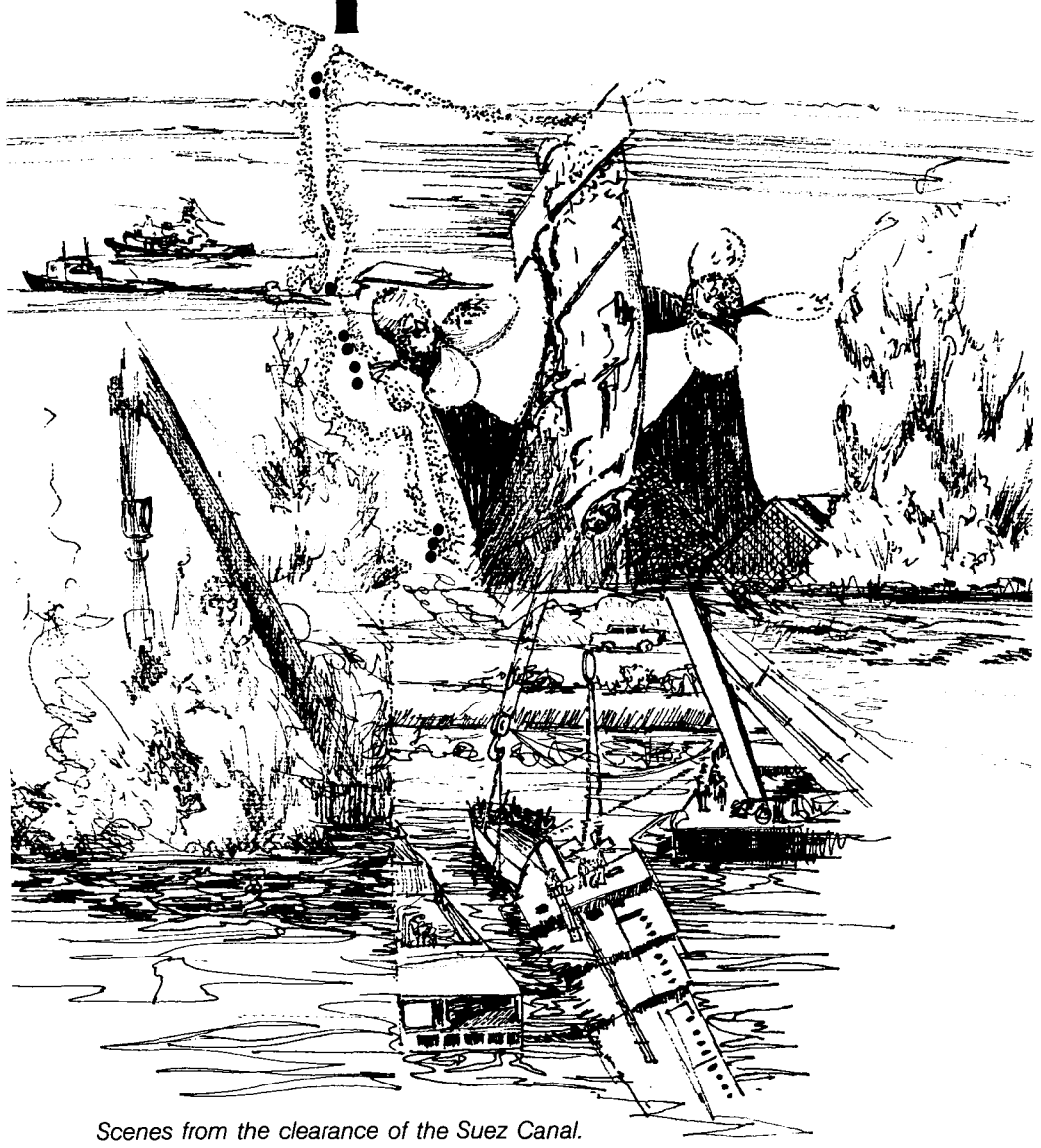
On 11 December 1941, the Bureau of Ships created the Naval Salvage Service. A Supervisor of Salvage was appointed to administer all its responsibilities, including the newly established contract with Merritt-Chapman and Scott. This Supervisor was (then) COMO Sullivan, who went on to Europe to oversee Naval salvage operations there.

That was the beginning. The Office of the Supervisor of Salvage has, because of the efforts of RADM Sullivan and many others who followed him, become an integral part of Naval operations. Even during peacetime, Naval salvage operations have expanded in size and scope. Today, the Office of the Supervisor of Salvage maintains contracts with a number of civilian salvage companies. It also utilizes its own personnel, equipment and expertise to assure the availability of assistance in shipping emergencies.

NAVY SALVAGE:

Support for U.S. Military Capabilities

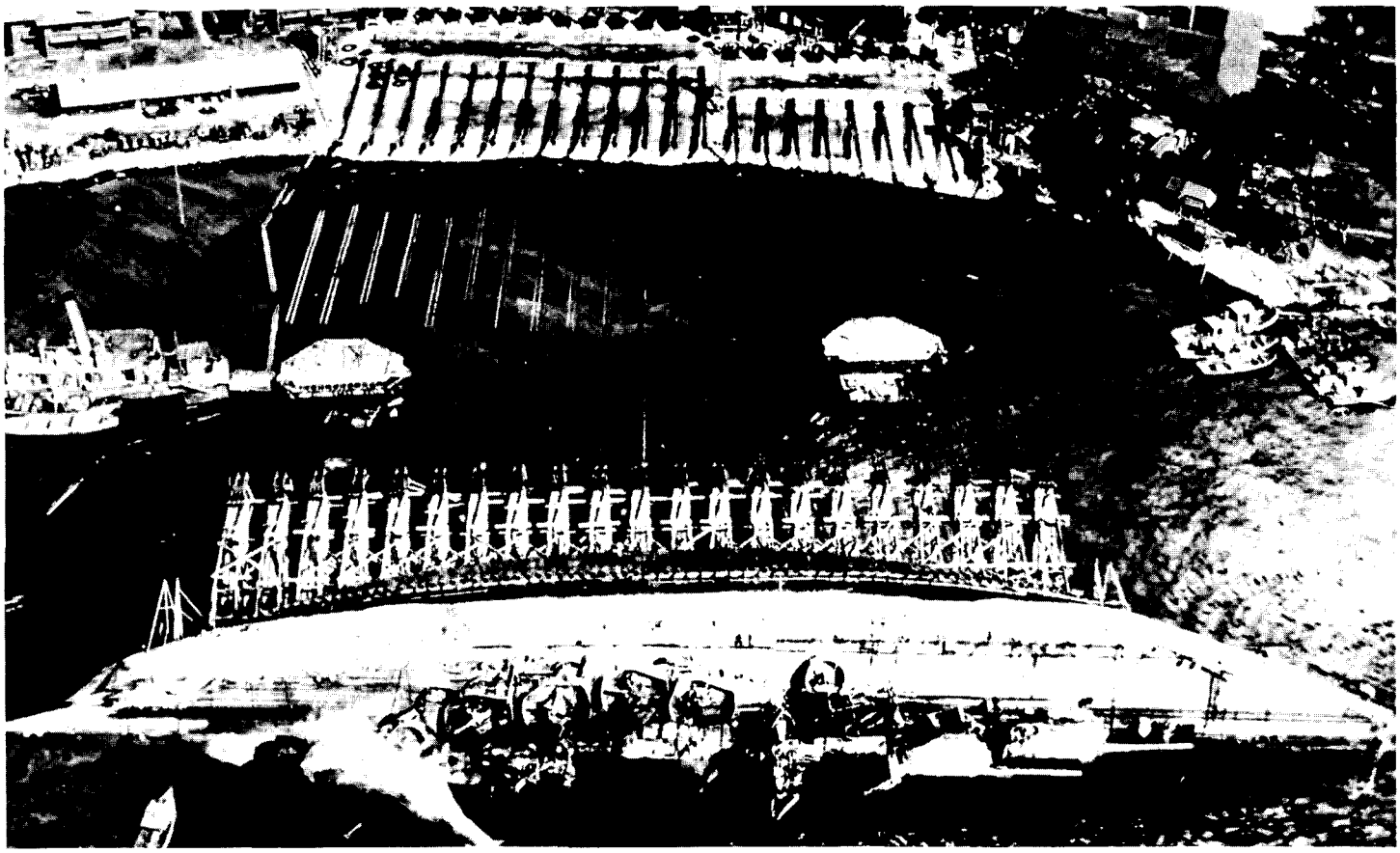
EDITOR'S NOTE: CAPT Charles Maclin is the current Supervisor of Salvage. He has worked in the Office of the Supervisor of Salvage since 1977, first as Assistant for Salvage, and later as Deputy Director. He is a graduate of the United States Naval Academy and has received a Master of Naval Architecture and Marine Engineering, and a Naval Engineering Degree from the Massachusetts Institute of Technology. In the Navy, he has served in two destroyers as Weapons Officer and Engineer. Since becoming an Engineering Duty Officer in 1971, he has served as Salvage and Docking Officer at the Boston Naval Shipyard, Salvage and Materiel Officer for Service Squadron Eight and on the staff of Commander Naval Surface Force Atlantic, as Atlantic Fleet Salvage Officer. (For biographies of former Supervisors of Salvage, see page 30, this issue.)



Scenes from the clearance of the Suez Canal.

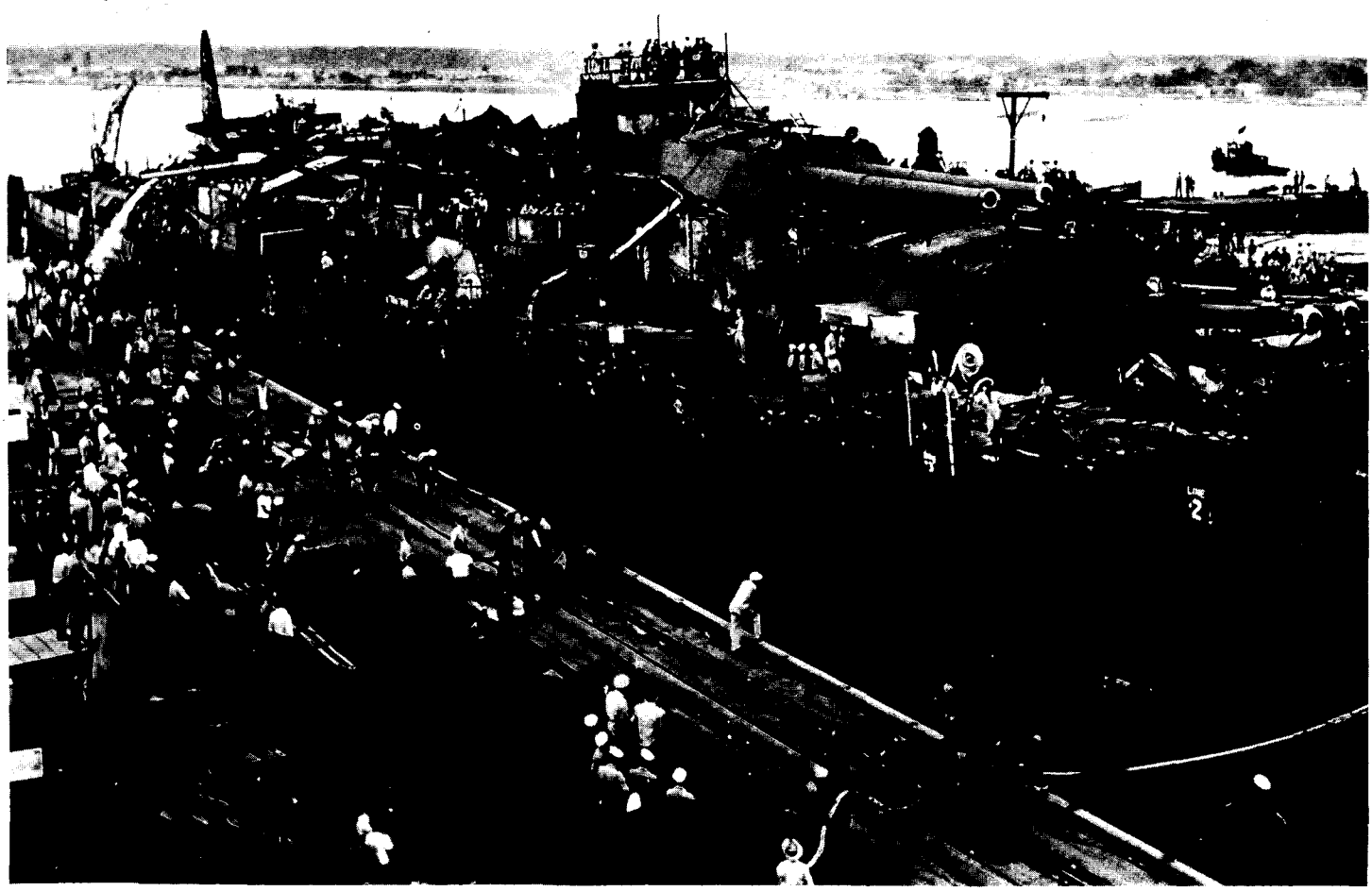
CAPT Charles Maclin, USN
Supervisor of Salvage

The Office of the Supervisor of Salvage was established in 1941 to meet the demands of a wartime salvage effort. Beach and harbor clearances, ship salvage and underwater repairs at Pearl Harbor, Cherbourg and elsewhere demanded a strong salvage service. After the War, military personnel developed applications for salvage technologies during peacetime as well. The Office of the Supervisor of Salvage, responding to growing demands from the Fleet, expanded its responsibilities to include diving, salvage, pollution abatement, search and recovery and underwater maintenance. Advances have been demonstrated in a number of landmark salvage operations. Today, SUPSALV carries out its responsibilities by providing technical assistance, equipment and personnel, and operational assistance through commercial contractors.



UPI/Bettmann Archive

The USS OKLAHOMA being parbuckled with cables and electric motors on shore.



UPI/Bettmann Archive

Afloat again, the OKLAHOMA is ready for outfitting in a Pearl Harbor drydock.

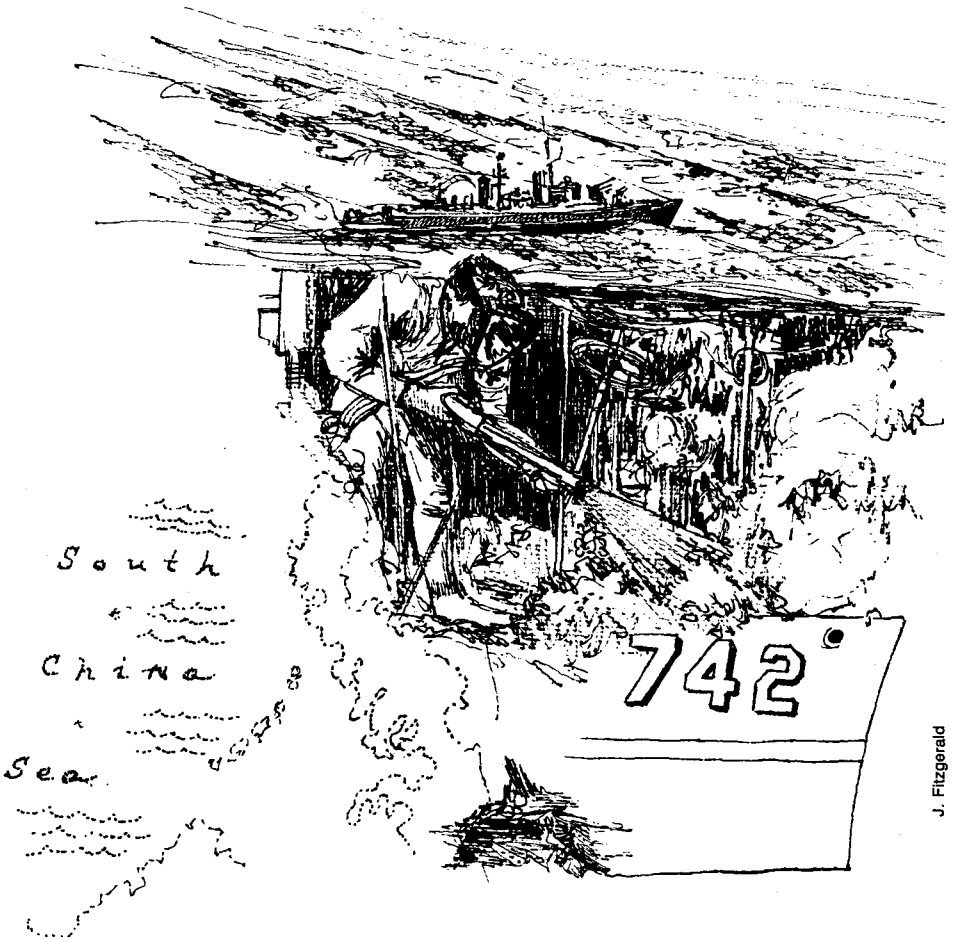
Early Navy Salvage Work

The U.S. Navy's organic involvement in salvage operations (other than submarine salvage) began with the Japanese attack on Pearl Harbor. The extensive damage made restoration of the harbor and recovery of loses seem an insurmountable task. Salvage personnel faced the challenge with tenacity and ingenuity and within months, raised several ships, some thought to be lost. The NEVADA was afloat just two months after it was sunk. The CALIFORNIA was raised in four months. The OGLALA, originally thought to be unsalvageable, was refloated in spite of cofferdam failures, a fire and one resinking. This ship was eventually assigned to the South Pacific Force as a salvage tug. The battleship OKLAHOMA, which had rested on the bottom of the harbor at an angle of 150 degrees from upright, was righted and floated. Twenty high-geared hauling winches were manufactured and installed ashore to exert the force needed to parbuckle the ship. For each of these operations, personnel devised methods to overcome the complications of the job, and proved the value of salvage work in maintaining a strong Fleet.

The Navy distinguished between Fleet salvage operations and coordination of civilian contractors' work during the War, and the distinction remains today. The title of Supervisor of Salvage was established in 1941 in the Bureau of Ships. The first Supervisor of Salvage, Commodore William Sullivan, was later transferred from the Bureau to Europe to direct Fleet salvage operations. He supervised such activities as the clearing of Cherbourg Harbor and repairs, beach clearings and firefighting so important to the success of the Normandy invasion. CDR B.E. Manseau relieved Commodore Sullivan as SUPSALV. He coordinated the civilian salvage work performed on the East Coast of the United States by the Merritt-Chapman and Scott Salvage Corporation, which was under contract to the Navy. This commercial organization was the only U.S. salvage company at that time. These civilian salvors were known as the Navy Salvage Service.

The Office of the Supervisor of Salvage Today

The Office of the Supervisor of Salvage has continued in the rescue and salvage role it had performed during the war. In addition, as advances were made in Naval engineering, new and varied tasks were assigned in support of Fleet activities. The components of today's SUPSALV office are reflected in six major areas of responsibility. The Office, composed of 49 civilian and 11 military personnel, performs duties in salvage, underwater maintenance, diving, search and recovery, offshore pollution abatement and diving systems certification. Within these areas, SUPSALV establishes policy, procures equipment, establishes operational procedures, provides technical information and operational assistance to the Fleet.



J. Fitzgerald

Scenes from the salvage of the USS FRANK KNOX.

Ship salvage is a major component of SUPSALV's work. However, the number of Naval ship salvage operations has been decreasing while salvage of other equipment is on the upswing. The most recent incident, in which SUPSALV was involved, occurred when the USS BARBOUR COUNTY ran aground in San Diego on 26 April 1984. This operation, under the OPCON OF COMTHIRDFLT, was successfully completed by Commander Service Squadron FIVE using the USS QUAPAW, USS FLORIKAN, and USNS NARRAGANSETT. In this instance, SUPSALV's participation was limited to providing commercial salvage ship backup.

SUPSALV is the technical coordinator within NAVSEA for all underwater maintenance. This area of responsibility has increased in recent years. The Office provides technical assistance and direct assistance to the Fleet through the use of its underwater maintenance contractor. For example, the Office administers the Navy's hull cleaning program, providing contractors to complete the necessary work. Related engineering functions include underwater tool design, writing underwater maintenance procedures, and development of an underwater tool package.

The Navy Diving Program encompasses both operational and technical responsibility for Navy diving. These include management of diving equipment from design, development and testing to acquisition and distribution. Technical direction is provided to the Commanding Officer of the Navy Experimental Diving Unit, where advanced diving apparatuses and methods are tested. Within the Program, procedures for the performance of diving operations are established, and technical direction is provided to the Fleet concerning diving activities.

The search and recovery duties assigned to the Supervisor of Salvage are primarily operational. Personnel both search for missing objects, and

Tail section of Air Florida airliner following the crash in January 1982.

identify and classify them. The Office receives many requests for assistance in the location of objects in deeper water. In recent years, SUPSALV has performed, or has offered support in the performance of, a number of object recoveries. One such operation was the recovery of the NASA space shuttle boosters which fell into the Atlantic off Cape Canaveral. The three-month effort, beginning in July 1982, required working in water 3,200 feet deep. SUPSALV also made initial plans for the recovery work following the crash of an Air Florida airliner in Washington, D.C. in January 1982. The actual salvage operation was performed by the Fleet. Recovery assistance was provided through the use of the Deep Drone, an underwater tethered vehicle owned by the Navy. This vehicle can operate at depths of up to 6,000 feet and is equipped with television camera, still cameras and two manipulators. It was used in the search and recovery operations associated with the crash of Korean Airlines, flight 007, shot down in September 1983. Maintenance and repair of the Deep Drone is accomplished by contractors directed by SUPSALV.

The Office of the Supervisor of Salvage also provides assistance in the containment and clean-up of offshore oil spills. When a Chevron oil well platform exploded off the Louisiana Coast in February 1970, the resulting spill and

Divers enter the water for Air Florida salvage operations.

fire threatened the coastline, recreational beaches and waters filled with fish. The Supervisor of Salvage was ordered to advise and send equipment to commercial companies whose containment booms were inadequate for the large task. The pollution control effort, only partially successful, spurred the Navy to develop new methods for protecting the environment. Such equipment as the hot tap, more capable containment booms and the Marco Class V Skimmer were the result. This skimmer can be self-propelled or towed, and is small enough to be trucked to an emergency site.

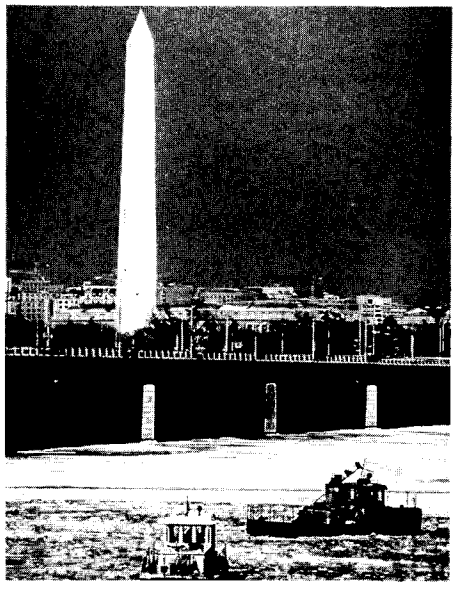
SUPSALV's spill containment and clean-up capabilities include the provision and storage of equipment and the development of methods to assure rapid response in pollution emergencies. Technical assistance is also available through SUPSALV. OPNAV Instruction 5090.1, "Environmental and Natural Resources Protection Manual," describes SUPSALV's current pollution control capabilities.

"SUPSALV maintains an extensive inventory of offshore spill response equipment to support pre-designated Navy On-Scene Coordinators in offshore and salvage-related spill control operations. Offshore booms and skimmers, towing vessels, POL offloading pumps and related equipment are maintained in response centers in Williamsburg, Virginia and Stockton, California for rapid mobilization to spill sites worldwide. Equipment operators, mechanics and supervisory personnel deploy from these CONUS response centers with equipment. SUPSALV, with headquarters in Washington, D.C., can also provide a full range of technical experts and advisors or specialty equipment from Government, industry or academic institutions."

The diving systems certification program was added to SUPSALV's responsibilities in 1964. It assures that all equipment and procedures used by Naval divers are safe. Two hundred sixty-nine afloat and portable ashore systems are managed in the Office of the Supervisor of Salvage. These include diver-worn life support systems, surface supported diver systems, recompression chambers, saturation diving systems, SEAL delivery vehicles and other miscellaneous systems. Technical reviews and on-scene inspections assure the adequacy of a system to operate over its intended mission range. For divers, this means equipment which will not fail under extreme pressure or at a critical moment.

SUPSALV and Civilian Contractors

SUPSALV's contracts with civilian salvage companies provide the flexibility to accommodate each unique salvage situation. It is the responsibility of the Chief of Naval Operations to assign salvage work. If the Fleet has the capability or is in a geographic location to accept a particular assignment, it will. SUPSALV will support the Fleet as needed, and is charged with providing and overseeing all contract assistance. The Office of the Supervisor of Salvage always oversees the work of contractors. The extent to which it provides technical advice, equipment, ships, personnel or direction is dependent upon the peculiarities of the situation at hand.



The 14th Street Bridge in Washington, D.C. - site of the Air Florida crash.

Landmarks of Navy Salvage

Several salvage operations stand out as landmarks because they demonstrate the technical and organizational progress made by the Navy in the last 40 years. These operations are prominent either for their size or for the application of new technologies.

The success of a large salvage job depends on the creativity of the salvage crew and organizational ability of project leaders. Two operations stand out as feats of organization and effort. In January 1950, the battleship USS MISSOURI went aground off Hampton Roads, Virginia. At the time of the incident, the ship was fully loaded and the tide was high. These factors, combined with MISSOURI's size, created a challenge for salvors. The enormous operation was accomplished with the aid of ten pontoons, nine sets of beach gear, eight tugs and dredges. The MISSOURI was successfully refloated in only 15 days.

Another operation noteworthy for its scale was the clearance of the Suez Canal in 1974. The 100 mile canal contained several wrecked ships, pontoon bridges and an earth causeway. It was the largest harbor clearance undertaken by the Navy since World War II, and it involved coordination of American, British, French and Egyptian personnel. The operation was a training ground for divers who used oxyarc cutting and underwater explosives to accomplish their mission. Passage through the entire canal was made possible within seven months.

Other salvage operations are landmarks because new techniques or equipment are used. When the USS FRANK KNOX ran aground on the Pratas Reef in the South China Sea, salvors experienced difficulties in making the ship buoyant. For the first time, salvors used a specially developed foam to displace water inside FRANK KNOX's hull. The successful application of this technique has been valuable in other refloating operations.

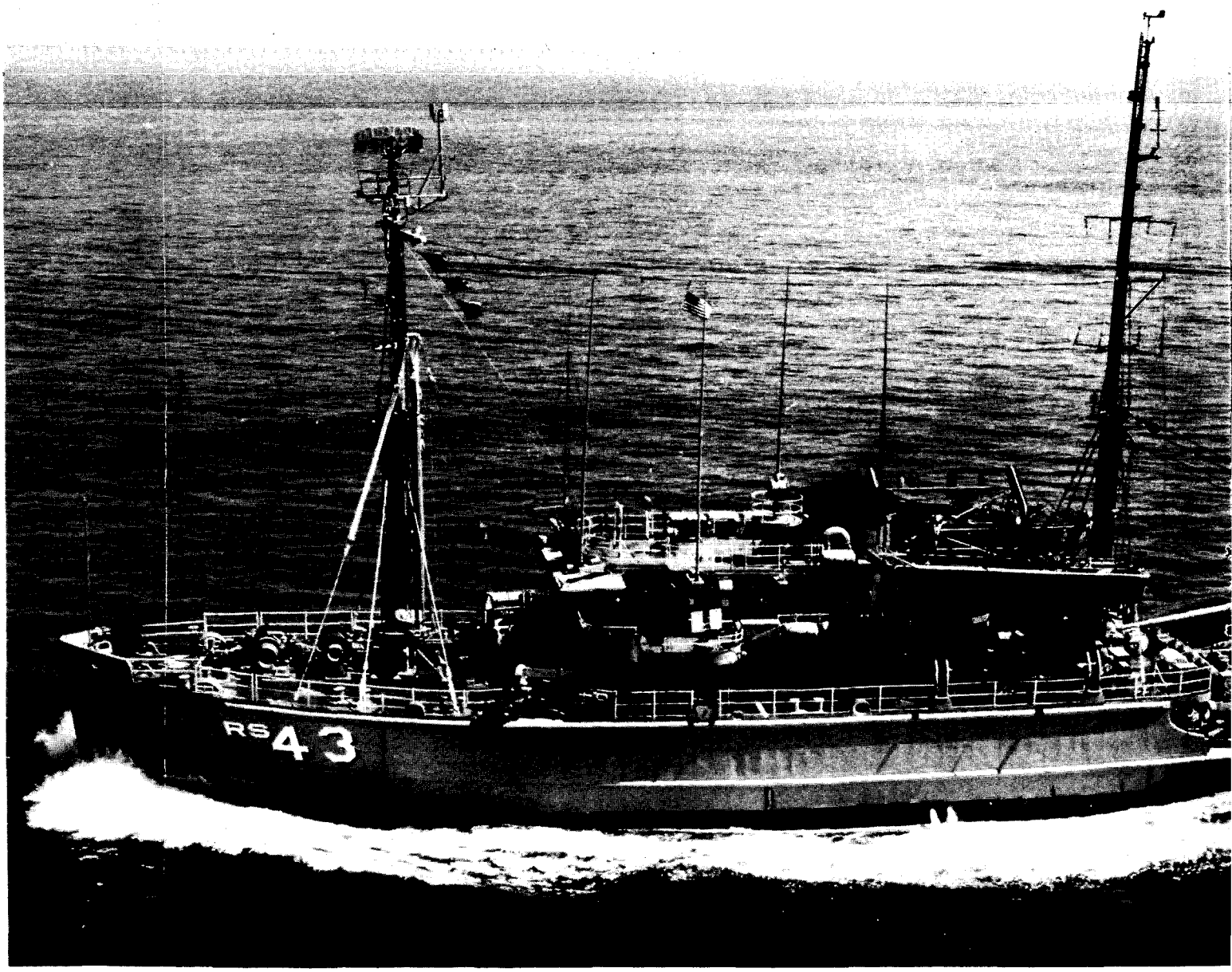
In March 1975, the Litton launching platform sank. Salvors, again facing difficulties in achieving required buoyancy, created another method to displace the water. By simultaneous pumping and blowing, in combination with specially designed relief valves, the necessary buoyancy was achieved without excessive stress to the weakened structure, and the platform was raised in less than a month.

Technological advances in ocean engineering, naval architecture and related fields will continue to affect Navy salvage functions. The most significant changes are likely to be in search and recovery technologies. The Navy currently has the capacity to explore at 20,000 foot depths. This capacity will be used and refined for increasingly advanced underwater recoveries and research.

Today, SUPSALV has capabilities beyond its initial rescue, salvage and harbor clearance functions. Primarily responsible for supporting Fleet salvage work, the Office has been tasked with developing, procuring and managing equipment; establishing operational procedures; supervising the work of contractors and providing technical assistance within its six major areas of responsibility.

THE HISTORY OF THE DEVELOPMENT OF

SALVAGE SHIPS IN THE U.S. NAVY

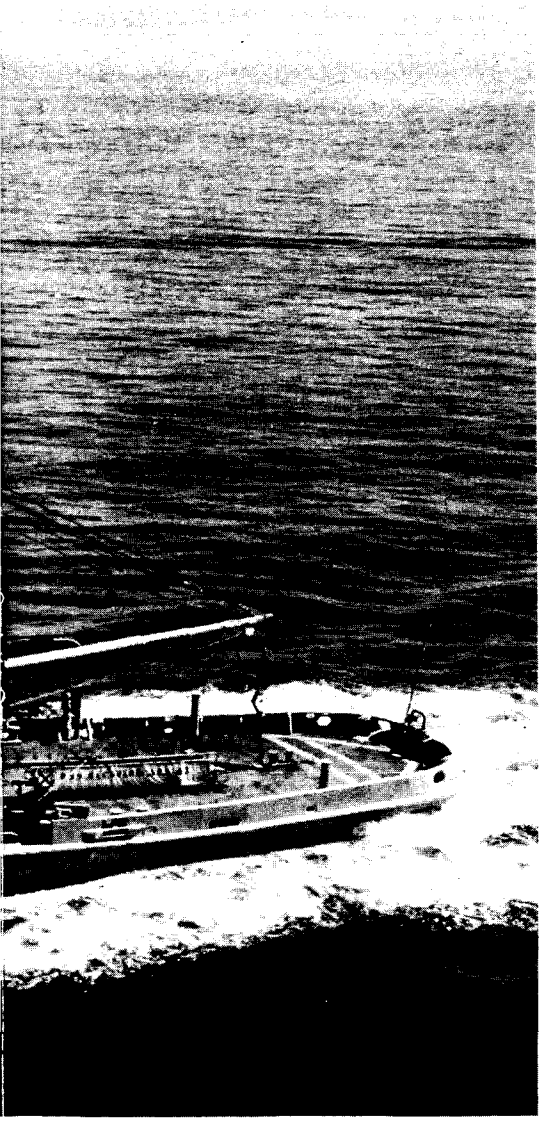


CAPT Willard F. Searle, USN (ret.)

The history of U.S. Navy Salvage Ship development spans a mere 60 years. It was not until the 1920s that Salvage Ships became a part of the Fleet. These early U.S. Navy Salvage Ships, the Bird Class, had not originally been designed for salvage purposes, but were converted from World War I minesweepers. From the time these Bird Class ships were put into the salvage service until the ARS 50 today, however, significant historical events have pointed to the importance of a strong salvage service. With technological advances, the U.S. boasts a number of salvage-type vessels well suited for the demands and dangers of sunken or stranded ship recovery, repair of damages, harbor clearance, deep diving support and rescue operations. The work of today's U.S. Navy salvage-type ships has resulted in savings of money, equipment and lives.

Changes in Navy salvage requirements from World War I to the present have led to a mix of ships and ship classes, which, in total, may be termed "salvage-type". This brief history takes into consideration Salvage Ships, Salvage Tugs, Rescue Tugs and Submarine Rescue Ships of the ARS, ATS, ATR, ATF, ATA and ASR Classes. Service craft and other auxiliary vessels, such as the ARST, AHLC/YHLC, ARSD/YMLC and ADT/YDT are also relevant in salvage ship history.

The development of these numerous ship classes proceeded as war clouds gathered. The threat of World War II made clear the Navy's need for worldwide salvage protection for its ships. A series of submarine disasters prompted the development of new technologies in submarine rescue and salvage. Advances in ship technology and diving capabilities also influenced salvage and towing technology. To all of these, the Navy has responded by using the best efforts of specialist salvage engineers and experienced operational salvage personnel to meet both wartime and peacetime needs.



USS RECOVERY (ARS 43) - a Combat Salvage Ship.

Salvage and Towing

When Navy salvage was in its formative stages, some distinctions were made which would affect subsequent technology in ship development. These distinctions result in three subsets of operations: rescue towing, ship salvage and submarine salvage. These classifications affect the ship's design, the ways the ship is equipped and its work assignments, and result in a "purpose-built" ship, matching its primary missions as directly as possible.

In COMINCH Publication 03, dated 21 June 1944, the (then) Supervisor of Salvage, COMO (later RADM) W.A. Sullivan states that tugs of several classes (ATF, ATA, ATR, ATO) had a variety of towing and other capabilities. Some were well fitted with firefighting and salvage equipment; others only minimally. For all, however, towing was their primary purpose.

Of Salvage Ships and Submarine Rescue Ships (ARS, ASR), Commodore Sullivan stated explicitly that, "Most of the vessels in these classifications are capable of towing to a greater or lesser degree. However, they were designed and constructed for certain other specific purposes and were fitted with some limited towing arrangements for work incidental to their primary function." The purposes he spoke of for ARSs were offshore or stranding salvage operations, necessitating that they carry large stores of valuable salvage equipment and that they not be "unnecessarily hazarded." Their work could be accomplished in water up to 60 feet deep. That they were not intended for towing is emphasized by the fact that the original design did not include a towing machine. It was only later in World War II that automatic tensioning towing machines were diverted from the ATA program to the ARSs.

The ASRs, as conceived in the 1920s, were designed to be capable of raising downed submarines in order to rescue their trapped crews. The original converted Bird Class ASRs, including the USS FALCON (ASR 2), were equipped with extensive compressed air plants and hoses which their divers could connect to the downed submarine and thereby raise it to effect rescue of personnel. This process is referred to as rescue-by-salvage. Thus, it is evident that the original ASR was also a salvage ship.

The distinctions noted above form a foundation for the technological development of today's Navy salvage-type ships, of which there are three basic subsets: Salvage Ships (ARS), Rescue Tugs (ATF/ATS) and Submarine Rescue Ships (ASR). The former two are often melded into a single multi-purpose design, as in the ATS 1 Class and possibly in the ARS 50 Class.

The Navy and Early 20th Century Salvage

In the late 1890s and early 1900s there was not much interest among Navy officials in developing ship salvage capabilities. However, some Navy personnel began to investigate the diving technology which had been advanced by the British. (The ship's diver, in those days, worked for the ship's gunner.) A small group of divers was eventually formed to undertake test and evaluation work. This group, under the joint direction of Warrant Gunner George Stillson and Diving Doctor George French at the Brooklyn Navy Yard, was completing their research and deep diving test program when the submarine USS F-4 sank off Honolulu

(March 1915). Stillson's team was hastily deployed to Honolulu where they participated in the successful salvage of the submarine. This marked the beginning of Navy submarine salvage.

The F-4 had sunk in 300 feet of water. The salvage operation was directed by Naval Constructor CDR Julius A. Furer and involved the use of tugs, lifting cables, pontoons and divers over a period of two months. The F-4 was dragged to shallower waters, floated and eventually towed into port. It was a monumental achievement for the time. Stillson's team wrote diving history and established records which, with the kind of diving gear they used, remain to this day. During the operation, Furer developed a salvage lifting technique employing submersible pontoons, dragging the boat to shallower water and finally raising it to the surface.

The success of the F-4 salvage operation and the conclusions and recommendations contained in the report of Stillson's diving trials had an immediate and major impact on the curriculum at the Navy Diving School at the old Torpedo Factory in Newport, Rhode Island. Later, upon U.S. entry into World War I, both instructors and students were sent to France to do salvage work. These specialists formed the nucleus of the Navy's salvage capability during that period.

Salvage During World War I

Julius Furer was a naval architect and a member of the engineering division of the Navy, the Bureau of Construction and Repair. Although the Bureau had always been responsible for the technical aspects of salvage, the Navy had no operational salvage capability. Operational salvage work during the War, therefore, was undertaken primarily by commercial salvors recruited into the Navy. Their efforts were significant. CDR Thomas Richey, in Bureau of Construction and Repair Technical Bulletin 2-25, "Ship Salvage," (5/1/25) stated that an estimated $100 million worth of ships had been restored to service through the efforts of U.S. salvors.

Salvage Tugs were used during World War I to perform both offshore work, such as assisting craft that had been stranded, and rescue towing those which had broken down. Harbor clearance, usually involving the removal of wrecks to permit passage into and out of a harbor, was also undertaken, but the tugs employed in the latter service were usually smaller (in terms of horsepower) and older than tugs used for offshore and rescue purposes.

After World War I, the Navy's Fleet Train (service forces) acquired several of the Salvage Tugs, which became officially referred to as "Fleet Tugs." These were originally designated ATs, and although similar to each other, did not constitute a class of ships because none were identical.

As of World War I, the distinction between rescue and salvage work was not significant to the Navy. Richey, in "Ship Salvage," explained that, "With regard to tugs, no special qualifications are required except that adequate guardrails, stability, and freeboard be provided. Tugs and salvage vessels merge in many particulars and it is not unusual to find a large tug employed in the capacity of a salvage vessel."

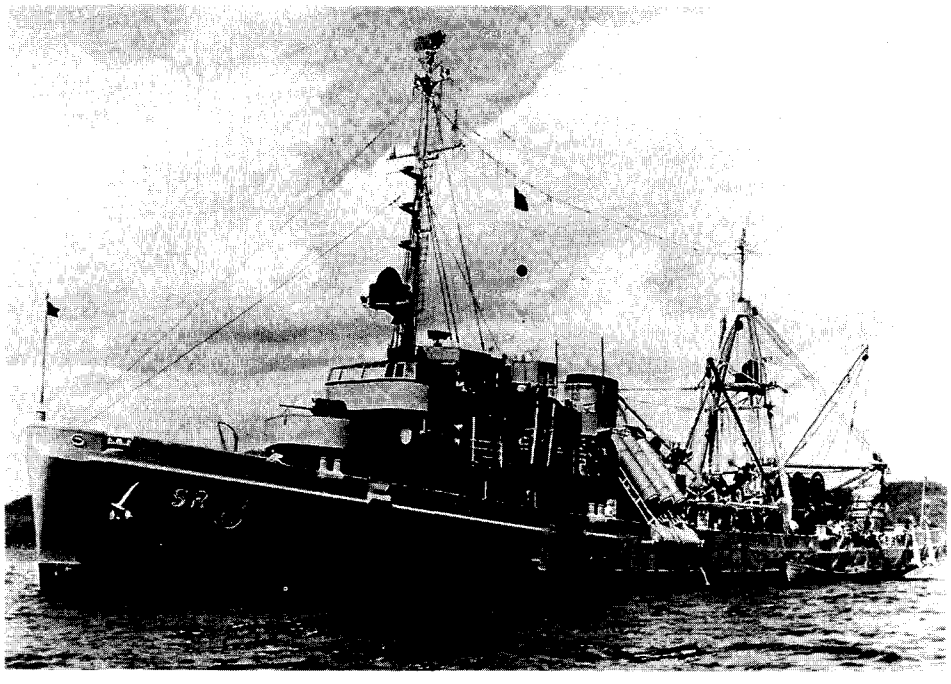
It was not until World War II that the distinction ("purpose-built") was made between various classes and between Rescue Tugs and Salvage Ships. The older World War I ships were eventually "reclassed" and designated ATO; the newly built Indian Class Fleet Tugs were designated ATF and the British-developed Salvage Ships were designated ARS.

It was not long before submarine salvage (rescue-by-salvage) became an important aspect of the Navy's work. With the realization of a need for a ship type capable of rescue-by-salvage, a specialized class of ships was conceived. This was the submarine rescue ship (ASR), the first several of which were converted from Bird Class minesweepers. The most famous of these was the USS FALCON (ASR 2).

Preparation for World War II

During the 1930s the Navy engaged in extensive conversion and new construction. With the threat of war in Europe, officials recognized the need to strengthen our Fleet's capabilities. Ships were re-engined and converted from coal to oil; reciprocating main propulsion was being phased out in favor of steam turbine propulsion; and high speed and radical maneuverability were emphasized. Accompanying these engineering and operational evolutionary developments were increasing instances of breakdown, including both main propulsion and steering failures. The Navy's battle forces began to recognize the importance of Fleet (Rescue) Tugs as a component of the Fleet Train. Also during this period, officials realized a need for increased offshore or stranding salvage capabilities. Finally, the Merritt-Chapman and Scott Corporation of New York, with whom the Navy had a long-standing contract to perform all but submarine salvage, had announced its intention to terminate its operations on the West Coast. Thus, in the mid-to-late 1930s, the scene was set for the expansion and improvement of Navy salvage capabilities. The situation was similar to developments in military capabilities which have occurred in the early 1980s.

The organization of a salvage and rescue service with a mix of ship types adequate to meet wartime demands did not proceed without difficulties. There was diversity of opinion among Naval personnel as to appropriate ship



USS COUCAL (ASR 8) - a Submarine Rescue Ship.

design. The equipment and ships from Merritt-Chapman and Scott were outdated and not sufficient in quantity or capability. Nonetheless, design and development progressed rapidly. Several new classes of salvage-type ships were built. The distinction between ships specifically built for rescue towing, submarine salvage and ship salvage was evident at this time. Purpose-built features were selected rather than multipurpose vessels.

The construction of the Indian Class ATFs had priority attention. The design of this purpose-built Rescue Tug was considerably influenced by recommendations from the commercial ocean towing industry, specifically from the top management of the Moran Towing Company of New York. (One of Moran's executives, Edmund Moran, eventually joined the Navy and was assigned as Commander of the Navy Rescue Towing Service. He was later placed in charge of towing operations in support of the Normandy landings. Edmund Moran rose to the rank of RADM, USNR, during World War II.) This ship featured 3,000 shaft horsepower of diesel electric propulsion and at the time was the world's largest and most powerful ocean tug. The use of diesel propulsion in these vessels paralleled the development of diesel engines for submarines. All Indian Class ATFs were eventually equipped with Almon A. Johnson Automatic Tensioning Towing Machines (See FACEPLATE, Fall 1983). The installation of these towing machines marked them as Rescue Tugs.

The ATFs provided yeoman service throughout World War II, as well as through the Korean and Vietnam Conflicts. They are, in fact, still being used by several foreign navies and by the U.S. Coast Guard. It was not until the late 1970s that they were superseded by a new Ocean Tug, the T-ATF.

Ships intended specifically for submarine salvage were also designed and built. In concert with the expansion of the Navy's submarine forces, the Bureau of Construction and Repair designed a class of purpose-built Submarine Rescue Ships (ASR). Because the submarine fleet was expanding so rapidly during the early years of World War II, two Indian Class ATFs were converted to ASRs, but with lesser capabilities. The original Submarine Rescue Ship, the FALCON, continued in service until it was sold out of the Navy in September 1947.

Another significant salvage-type class was developed during this period. The Combat Salvage Ship (ARS), as conceived in 1939 by (then) CAPT William Sullivan and the World War II Naval salvors, was intended to support amphibious landings and to clear combat-damaged ports of debarcation. These functions became vital during World War II. The ARS class was initially used in support of the landings in North Africa, the Mediterranean and Normandy. These ships subsequently were widely used in the Pacific.

Divers recover valuable parts from the USS ARIZONA at Pearl Harbor, 1943.

CAPT Sullivan strongly influenced the design of this class. His suggestions were based on observations he made in England during the Battle of Britain. Officials of Merritt-Chapman and Scott also offered advice regarding ship specifications. The ARS 6 or "narrow beam" ARS, not surprisingly, bears a strong resemblance to the Royal Navy's salvage ship design. During World War II, the construction of the ships in this class was accelerated and the design greatly improved. The ARS 38 was wider-hulled, more stable, and had superior weight handling capability.

In the ARS 6 and 38 Classes, designers made a clear distinction between rescue towing, on the one hand, and combat salvage capabilities on the other. As earlier noted, the ARS was not originally provided with a towing machine, but rather, with a powered wire rope reel. Eventually, during the Pacific campaigns of World War II, automatic tensioning towing machines were diverted from the ATA Class and installed in all ARS ships as a SHIPALT.

There is further evidence that the ARS was designed for combat salvage rather than rescue towing. It is worthy to note that, after World War II, the management at the Merritt-Chapman and Scott Corporation expressed a preference for buying or leasing ATFs or ATs, rather than ARSs, from the government. The latter were more suitable for the rescue work they generally performed. However, their requests for these ships were denied by the Navy and 3 ARSs were assigned. This emphasized that the Navy's interest was limited to offshore salvage. The Navy also asserted that it had no intention of subsidizing the ocean towing business or of favoring one firm (*i.e.* Merritt-Chapman and Scott) over another (*i.e.* Moran).

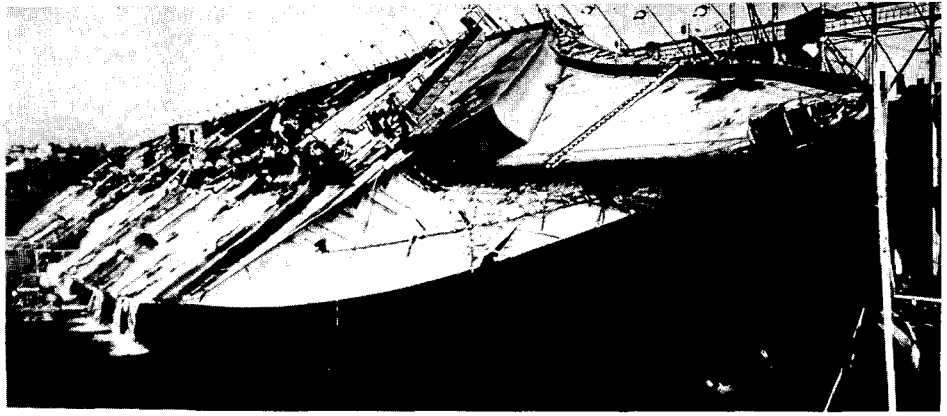
After World War II, and during the Korean Conflict, the ARS was used widely by the Service Forces, both Pacific and Atlantic. Its many assignments included rescue towing along with the ATFs. By this time, all ARSs had been fitted with automatic tensioning towing machines and the two ship types—ARS and ATF—were used almost interchangeably.

Salvage During World War II

The demand for salvage ships, crews and organization was great during World War II, and the Navy worked diligently to meet wartime salvage needs. In America, Europe and the Pacific, salvage, harbor clearance, beach clearance, repair and other responsibilities were defined and carried out by newly organized teams.

Just prior to World War II, a salvage and diving training school was to be opened at Pearl Harbor. After the Japanese bombing there, the plans to establish the school were abandoned, and personnel were put to work performing the enormous task of restoring the ships and clearing the harbor.

Another disaster, the burning and capsizing of the USS LAFAYETTE (ex-NORMANDIE) was seized as the training opportunity Navy salvors had been awaiting. The salvage of the LAFAYETTE would be used to train personnel so desperately needed to clear harbors and repair war-damaged ships both in Europe and in the Pacific. From the day the school in New York opened, the Navy found that the demand for qualified officers and enlisted men exceeded the rate at which they could be trained. In an attempt to provide salvors for operations around the world, instruction was given 24 hours a day, 7 days a week. There were times when a class was needed so urgently that it never formally graduated, but left in the midst of



The USS LAFAYETTE being salvaged in New York, 1943.

training to begin salvage operations where a crisis situation appeared.

Never before had the importance of salvage work been so clear to Navy officials. A draft document was written in the Office of the Supervisor of Salvage in approximately 1945. Entitled, "Official U.S. Naval History of the Ship Salvage Organization in the European Theater," it described these functions.

"With the coming of large scale amphibious warfare, Ship Salvage organizations were no longer an adjunct to U.S. Naval operations, but became highly important integral parts of each Navy expeditionary force, taking part in planning actual assault operations, and charged with clearance and maintenance of beachheads so that no obstacles might hinder the smooth flow of all traffic in the assault areas.

"After the initial phases have been accomplished, the Ship Salvage Force must take over the all-important responsibility of rehabilitation and development of ports to enable their full utilization in the shortest time possible. It can be said that upon their industry and efficiency rests the overall success of an entire expeditionary force in no less a degree than on all other combatant and logistic components.

"Grouped under Ship Salvage Command are:

Ship Salvage and Rescue Forces,
Fire Fighting Groups,
Combat Salvage and Fire Fighting Units,
Harbor Clearance Units,
Harbor Hydrographic Groups.

Each unit or group, under the Principal Salvage Officer, has under its cognizance the function indicated by its title, and more fully described, includes ship and personnel rescue, fire prevention and fighting; expert application of all advanced techniques in underwater demolition; rendering safe, or explosion of bombs and mines; underwater cutting and welding; underwater patching and repair; use of pumping or compressed air for floating wrecks, use of lifting craft and pontoons for raising and moving wrecks, and use of all types of beach gear for removing and salvaging stranded craft and ships."

The amount of salvage work completed during World War II was extremely significant to the war effort. Admiral Furer, who supervised the preparation of and edited *United States Naval Administration in World War II*, Bureau of Ships, Vol. 2 (1952), points out that, during the fighting at Normandy, more mine damage was suffered by U.S. ships than in all other invasions combined. The hard work of the Salvage Force kept all but four of these ships afloat. There were times when the U.S. Navy would have suffered serious losses if the Salvage Forces had not been there to raise sunken craft, make emergency repairs and clear wreckage.

Although there is some diversity of opinion as to exact amounts, there is no question that the monetary value of salved ships, equipment and cargoes far exceeded the cost of establishing and operating the U.S. Salvage Force. Estimates of what was saved run between several hundred million and two billion dollars. The total cost of ships, equipment and personnel training was approximately 29 million dollars.

Renewed Interest in Salvage Ship Development

Following World War II, salvage technology remained relatively static. It was not until the late 1950s and early 1960s that consideration was given to upgrading the salvage-type ship's capabilities, particularly to the specification and design of a new ARS. At that time, a design was proposed by (then) Fleet Salvage Officer, Pacific, CAPT W.L. (Scotty) Marshall. The project he started was continued through CDR Frank Laessle's, CAPT Bill Searle's and CAPT Gene Mitchell's watches as Fleet Salvage Officer, Pacific.

In order to present a strong argument for the construction of a new Combat Salvage Ship, advocates proposed that the same hull be built in two configurations, one for the new ARS and one for a new ASR. This plan was abandoned, however, on the basis of the 1965 recommendations from the post-THRESHER Deep Submergence Systems Review Group. In the end, the new ASR was developed separately as the catamaran-hulled ASR 21 Class.

The ASR 21 Class (PIGEON and ORTOLAN) is significant in the history of salvage-type ship development. It represents the first class design which was driven by consideration of diving and submersible technology. The ships' primary mission is to support the Deep Submergence Rescue Vehicle (DSRV) and to facilitate its movement through the air-sea interface. The DSRV is used to rescue submarine personnel at considerable depths. The catamaran-style hulls and lift-out platforms were provided to enable easy submergence of the diving systems. The ships also have the capability to moor in 1,500 feet of water, so they can remain stationary while rescue operations are in progress.

The ASR 21 Class is far more sophisticated than any of the salvage or rescue vessels built previously. These ships are purpose-built in the extreme. They are not suitable for combat salvage or rescue towing. They have work and diving platforms quite useful for deep search and recovery, but deck space adequate for only limited salvage operations.

Expanding Capabilities in Navy Salvage

In the 1960s, salvage-type ships and the salvage service were becoming important for a variety of purposes. Technology in deep diving, deep salvage and recovery of aircraft, ordnance and other objects was advancing. Related operational responsibilities were assigned to the Office of the Supervisor of Salvage. Both the technological challenge and the Navy's responsibility led to the Navy's first major aircraft recovery.

On 8 February 1965, an Eastern Airlines DC7B airliner carrying 84 passengers crashed into the Atlantic Ocean eight miles off Jones Beach, on the south shore of Long Island. The Civil Aeronautics Board, desiring to discover the cause of the accident, enlisted the aid of the U.S. Navy. Six days after the crash the USS TRINGA (ASR 16) commenced recovery work at the wreck site.

Crew members on the TRINGA built two expandable baskets which were used to lift sections of the wreckage. The salvage operation lasted 29 days

UPI/Bettmann Archive

Parts of the DC7B Airliner are examined.

and divers spent about 185 hours lifting pieces of the airliner to the surface. In spite of poor visibility and work with sharp pieces of metal, the job was completed without incident. The recovery marked increased versatility in Navy salvage operations and demonstrated the salvage and recovery capabilities of the ASR.

Advances in salvage technology, specifically in deep recovery, were further demonstrated when the Navy was called upon by the U.S. Air Force to locate and recover a lost H-bomb off the coast of Palomares, Spain.

On 17 January 1966, a B-52 bomber collided with a jet tanker while refueling. In the resulting crash four H-bombs were ejected. Three of the bombs parachuted to a landing ashore. The Navy was tasked to search for and recover the missing fourth bomb. An operation of enormous magnitude was rapidly organized to explore a rugged ocean bottom in water depths of up to 3,000 feet. Equipment used ranged from SCUBA and hard hat diving gear to complex ocean bottom scanning sonars and advanced submersible vehicles. Navy minesweepers and salvage-type ships were also utilized. When the bomb was located by two submersible vehicles, it was lifted to the surface by USS PETREL (ASR-14).

The search for and recovery of this H-bomb was the most extensive deep recovery salvage operation the Navy had undertaken to that time. The organization, salvage skill and technology used demonstrated the expanded scope of U.S. Navy salvage.

New Salvage Ships

In the 1960s, a whole new dimension for Navy salvage and diving services was conceived. To meet the demands of salving larger, faster surface craft, and to accommodate wartime salvage operations, new ships were needed.

By 1964, two circumstances became very important in the considerations of planners and ship designers. The first was the mounting tension in Vietnam, where a major combat salvage and harbor clearance operation was anticipated. The second was the increasing use of super tankers and other large ships, including CVAs, AOEs and large container ships chartered by MSTS. In response to these factors, by 1967, the ATS 1 class Ocean Salvage Tug was conceived, proposed by the two Service Force commanders and presented to the Ships Characteristics Board. In addition to being designed for combat salvage, the ship had three other principal military features. First, its towing plant included two automatic tensioning towing machines. It was equipped with diesel engines which would generate up to 6,000 shaft horsepower. It was therefore capable of towing very large vessels. Second, to accomplish major combat and amphibious salvage operations, it was designed with more deck space than previous Combat Salvage Ships, and would have more capable weight handling and rigging features. Third, in response to the development of capabilities for deep salvage work and for subsea search and object recovery, it was to be built to support the Mark 1 Deep Dive System. Later, this class was given the Mark 12 surface-supported diver system.

The first ship of this class, USS EDENTON (ATS 1), was launched in Lowestoft, England in May 1970. It was to provide the most advanced services to date in combat salvage, rescue towing and diving. It was conceived that the ATS class could replace both ARS Combat Salvage Ships and the ATF Rescue Towing Ships. The ship was designed to be multi-purpose and was somewhat larger than either the old ARS or ATF.

The T-ATF was designed in the 1970s primarily to replace the point-to-point towing capability of the Indian Class ATF. Combat salvage and rescue towing were not emphasized. The T-ATF is a 6,000 shaft horsepower, civilian-manned vessel. Because its specified primary mission is for point-to-point towing, it was built without automatic tensioning towing machines. Now, consideration is being given to refitting T-ATFs with automatic tensioning towing machines to make them more generally capable of rescue towing and, to a lesser extent, offshore salvage services.

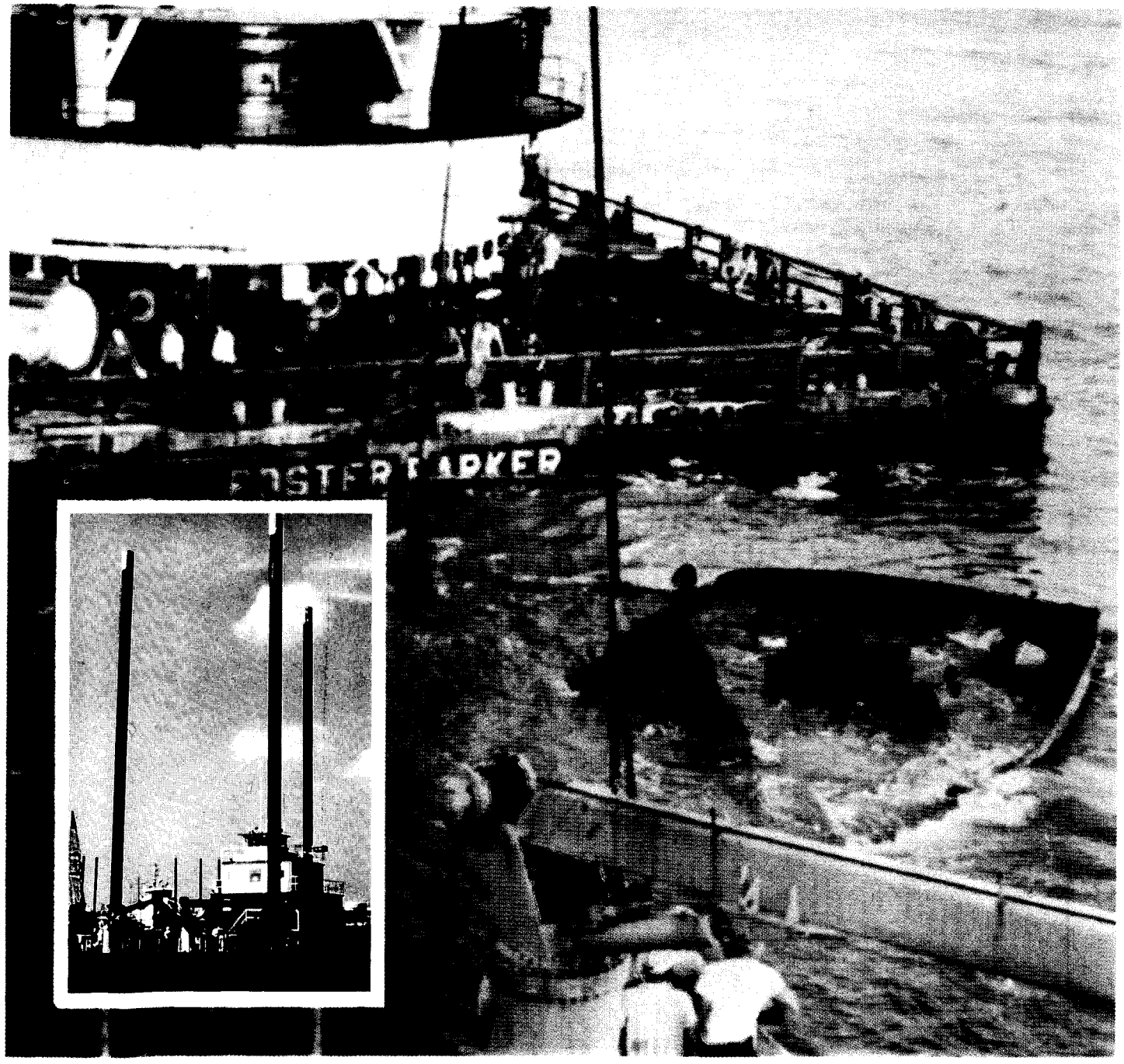
The current new addition to the Navy's fleet of salvage-type vessels is the ARS 50. The ship is multi-purpose, designed to provide offshore salvage, clearance salvage, rescue towing and general towing services. It will also be capable of supporting extended air diving. In the ARS 50, characteristics which formerly distinguished those ships intended for rescue towing from others intended for salvage are melded. This new design offers a full range of salvage-related capabilities.

The ARS 50 is being built to exert a towing force of approximately 90,000 pounds at 8 knots and 65,000 pounds at 12 knots. It can be driven sideways to hold position during salvage and rescue operations. Each ship is fitted with two Almon Johnson Towing Machines with automatic tensioning features; four beach gear hydraulic pullers; and two bow rollers capable of a 75-ton heavy lift. Equipped with a recompression chamber, the ship will support diving to 190 feet.

The development of this ship class demonstrates the Navy's continued interest in maintaining a capable combat salvage and rescue towing force. It also demonstrates a commitment to providing comprehensive salvage services which include heavy lifting, rescue towing and diver support.

Examination of Navy salvage-type ships from the first Bird Class minesweeper conversions to today's ATS 1 and ARS 50 Classes reveals increased technological sophistication and operational responsiveness for combat needs and circumstances. The early Submarine Salvage Ships were vital in recovering sunken submarines and saving lives through rescue-by-salvage. During World War II, Rescue Tugs performed towing operations while Combat Salvage Ships had distinct functions to support amphibious wartime missions. Later, increased sophistication in ship design and diving technology led to the development of salvage-type vessels fitted for higher-powered towing, advanced diving support and deep search and recovery. New salvage-type ships have been designed and built primarily to replace the successful Combat Salvage Ship (ARS 7 and 38) and the Indian Class Fleet Tug. The new ATS 1 and ARS 50 designs include improved state-of-the-art diving systems, salvage equipment and propulsion plants with higher power and improved maneuverability. The T-ATF Class, which was not originally conceived to have combat salvage or rescue towing capability, is being upgraded. In sum, the operational, engineering and design expertise of Navy salvage personnel has resulted in sophisticated and appropriate ships for the needs of the Navy and other Americans working on, or under, the sea.

The Salvage of the M/V EAGLESCLIFFE



LCDR Jim Bladh, USN (Ret.)
Diving and Salvage Operations Specialist
Office of the Supervisor of Salvage

Author's note: The following account is based on excerpts from the salvage report of the EAGLESCLIFFE, the daily log and personal observations.

The M/V EAGLESCLIFFE, a single-deck ship of steel construction, displacing 2,300 tons and carrying 3,500 tons of bulk grain, sank on 9 February 1983 off Galveston, Texas, when damage of unknown origin caused it to lose watertight integrity. Months later, heavy weather from Hurricane Alicia caused the ship to break into two sections. The afterbody remained more or less stationary at LAT 29°22'05"N, LONG 94°39'17"W. The forebody, however, drifted approximately two miles south, and grounded upright in 40 feet of water approximately 200 yards north of the Galveston Bay entrance channel between buoys 4 and 6.

The location of the forebody so close to the entrance channel, as well as unconfirmed reports of local fishing boats striking the wreckage, led the Army Corps of Engineers to declare the wreck a hazard to navigation. The possibility of another hurricane which could force the bow section further into the channel immediately caused the Corps of Engineers to initiate removal of the bow section of the EAGLESCLIFFE and to request assistance from the U.S. Navy Supervisor of Salvage (SUPSALV).

The Salvage Plan

On 29 September 1983, NAVSEA issued a delivery order to conduct a survey of the bow and stern sections of the wreck and to provide a salvage plan with recommendations for removal of the bow section from the area adjacent to the entrance channel. Contractor personnel were mobilized to Galveston on 2 October 1983, with the survey commencing on 3 October and completed on 5 October.

The results of the survey indicated that the vessel had broken in two just aft of bulkhead 67. The forebody was estimated to be 115 to 120 feet in length. During the breakup most of bulkhead 67 was torn away, leaving the #1 hold in free communication with the sea. The hatchcovers were missing and the forebody was estimated to contain 400 long tons of steel.

A detailed plan of action, which included equipment needed and personnel assignments, was developed based upon findings from the survey. The plan contained calculations of ship weight, forebody weight, mud weight, and approximate sling loading for hauling the wreck to the surface. However, builders' plans were not available for this effort and most information available to the Salvage Engineer was gathered from the owner's representative and local surveyors. It was not possible, therefore, to determine accurately the strength of the hull. The SUPSALV On-Site Representative, concerned that if wires were used to lift the wreck the hull would be cut in half, decided to order the construction of two 4' X 100' X 3/4" steel lifting straps. This would assure that the hull could be raised in one piece.

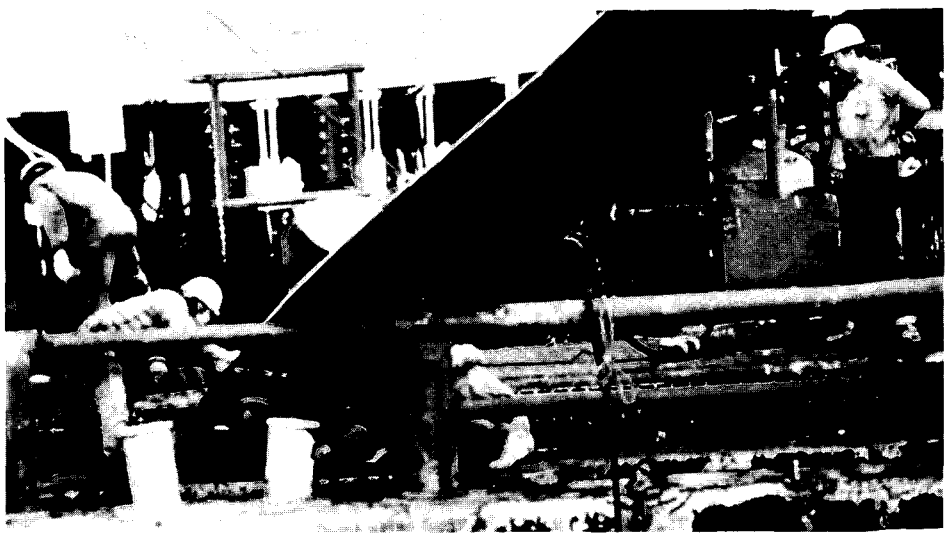
The salvage plan specified that a diving and work platform be moored upstream of the wreck. An airlift would be used to remove mud and debris from inside the ship and from the area around the stern. Messenger wires were then to be passed under the hull and the specially fabricated steel straps positioned under the wreck. The derrick barge would continue to lift the wreck to a stable condition, at which time the barge would be made up to a tug and towed to the dump site designated by the Corps of Engineers.

Equipment to be used included a jack-up work platform with two cranes, a 600-800 ton floating derrick, a 7,000 horsepower or more tug and a 600 cfm air compressor with hoses.

Pre-Removal Operations

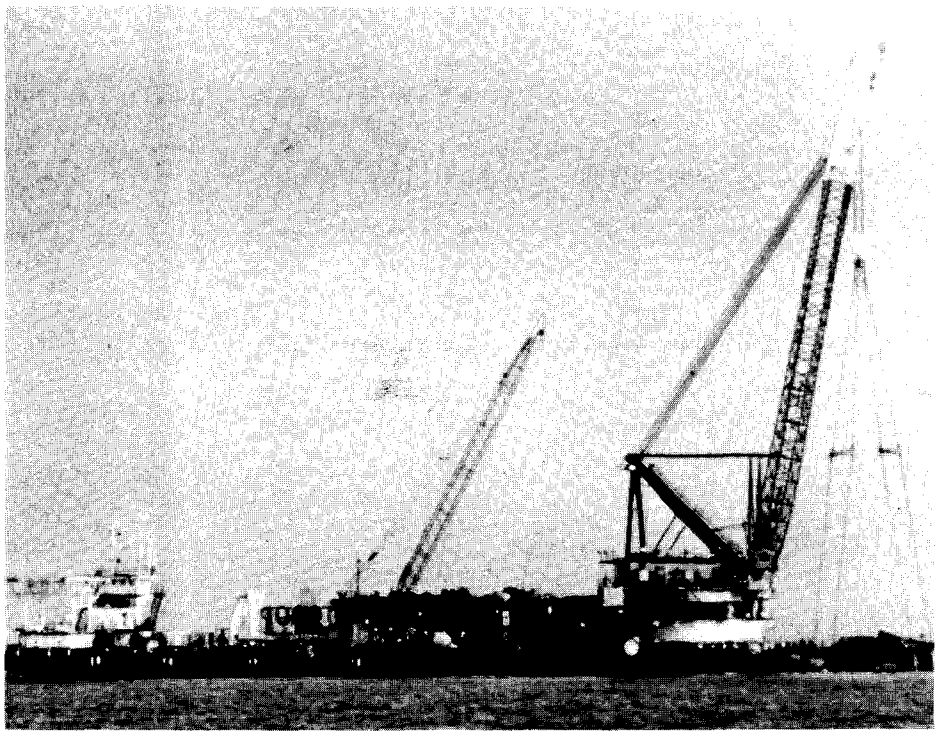
The salvage contractor subcontracted for diving services in support of the anticipated operation. Similar subcontracting arrangements were made for M/V WALTER REETZ and the derrick barge FOSTER PARKER, chosen because of its availability, proximity to the salvage site and superior seakeeping abilities.

The M/V WALTER REETZ, a self-elevated work-over platform (SEWOP), is often used as a work platform for offshore oil rigs. The WALTER REETZ was



Salvage crew members prepare the steel lifting strap used to raise the EAGLESCLIFFE.

Bow of the EAGLESCLIFFE just breaking the surface. The FOSTER PARKER is in the background.
Inset: The work platform M/V WALTER REETZ.



The derrick barge FOSTER PARKER.

selected as the diving platform for several reasons. It features 3 ton and 15 ton telescoping hydraulic cranes forward (which are excellent for rigging), hotel accommodations that will sleep and feed 20 men, and three mooring spuds that enable the platform to be jacked up above the water level. The spuds, planted on the ocean floor, offer a solid, comfortable work space which is not subject to rough seas. Although the Navy had not used a SEWOP in any of its previous salvage operations, the SUPSALV On-Site Representative and the Salvage Master agreed that this platform was an ideal work platform for the salvage of the EAGLESCLIFFE.

Digging Under the EAGLESCLIFFE

The salvage plan projected that a four foot deep by six foot wide tunnel was to be bored under the width of the wreck in order for messengers to be passed. Ultimately, through the use of the messengers, the steel lifting straps would be moved into place under the body of the ship.

On Monday, 10 October, tunneling underneath the wreck was commenced on the port side at a station below the after end of the forecastle deck. Bottom conditions consisted of hard packed clay covered with about a foot of black silt. For this process, the airlift was rigged in a vertical position and the diver alternated jetting the clay bottom loose and turning to jet the clay back toward the airlift where the residue could be removed from the excavation site.

On Tuesday, 11 October, divers continued jetting. Before diving operations were secured for the day, a messenger had been passed under the ship and the route for the tunnel was marked.

Jetting and airlifting continued all day Wednesday, 12 October with deteriorating weather and heavy seas.

On Thursday, 13 October, the M/V WALTER REETZ was positioned on the starboard quarter of the wreck, bow facing east. The jetting operations were continued on the after tunnel from the port side.

At 1300 hours the Brown and Root Barge Master and Foreman boarded M/V WALTER REETZ for a meeting with the Salvage Master. Plans for rigging the lifting strap and techniques for passing the straps under the wreck were discussed and agreed upon.

Passing the Messenger

Shortly after the meeting, a diver reported that the tunnel underneath the hull was completed. He passed a 3/4 inch polypropylene messenger beneath the wreck using a 10 foot lance as a probe. Then the diver, assisted by the crane on the M/V WALTER REETZ, passed a 1 inch messenger wire under the after section of the wreck. The messenger was secured to the SEWOP for the night.

The tunneling was completed and both messengers were rigged underneath the wreck. However, considerable preparation was necessary prior to the 0700, 15 October arrival of the Derrick Barge FOSTER PARKER.

The salvage plan showed that a significant amount of mud and grain would need to be removed from the wreck. A 40 foot long X 8 inch diameter airlift was fabricated for use in this effort. It was made in two sections with the top 20 feet fabricated with flexible hose designed to facilitate overboarding of discharge. Arrangements were made for procurement of a 600 cfm air compressor to drive the airlift and a 250 psi, 1600 gpm jetting pump for use with the diver-held T-nozzle jetting lance.

Rigging Operations

On 7 October 1983, the Army Corps of Engineers authorized SUPSALV to proceed with removal operations on the ship's bow section. The salvage work was begun on 8 October 1983. The compressor, airlift, jetting pump, shallow water dive system, wire pendants, shackles and line were loaded aboard the M/V WALTER REETZ which arrived on the wreck site at 0850.

The airlift was rigged in place and suspended just off the surface of the mud with a hydraulic crane from the M/V WALTER REETZ. Divers began to wash mud and the remainder of the cargo of grain out of the #1 hold using the jetting lance and airlift.

The depth of the water in the #1 hold to the top of the mud was between 28 and 38 feet, indicating that as much as 10 feet of mud and grain had been deposited there, primarily on the starboard side.

By the end of the first day, approximately 200 tons of mud and grain had been removed from the #1 hold and pumped overboard.

Demudding of the #1 hold was completed on the second day of airlift operations.

By Friday, 14 October, a significant amount of clay and grain had been redeposited in the cargo hold due to heavy seas and tunneling operations. Approximately three hours were required to remove this material. Because of potential difficulties, a diver used an underwater burning rig to burn a port anchor chain which had been discovered earlier. The chain extended out through the hawsepipe and disappeared underneath the wreck. Burned through, the chain was dropped to the bottom. The airlift was used to remove

mud from the port side compartment beneath the wheel house. Portholes were opened in this compartment to free suspected H_2S contained there.

The starboard anchor was then burned through, dropped to the bottom and rigged for pickup by the crane. The chain was brought up in bights by the crane. Approximately eight shots of chain were removed from the starboard chain locker and deposited on the SEWOP.

Lifting Operations

As planned, the Derrick Barge FOSTER PARKER arrived at the wreck site under tow by the Jackson Marine tug MISTER RICHARD. The derrick was positioned in a six-point moor.

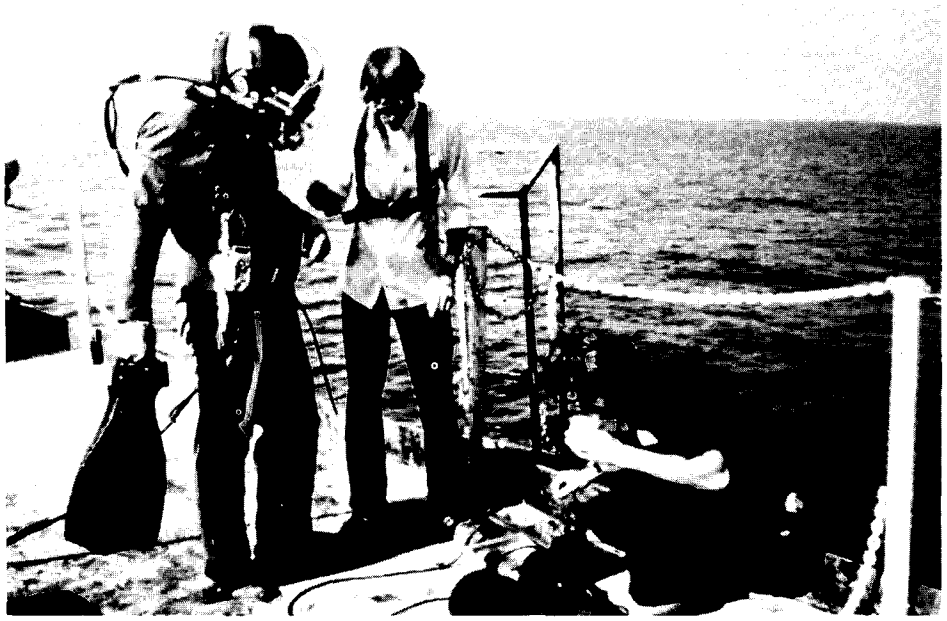
The Marine Safety Office (MSO), Galveston Coast Guard, was informed that one of the FOSTER PARKER mooring legs had been set in the center of the channel, and that all shipping should therefore favor the south side of the channel. A lighted buoy was placed to tend the anchor.

D/B FOSTER PARKER was moved into position. A diver was sent to retrieve the forward 1 inch messenger already in place under the wreck and attach it to the port crane of SEWOP. The wire was transferred to the FOSTER PARKER on the middle hook. The 2 inch messenger was connected to the 1 inch messenger and passed beneath the wreck.

At this point, riggers on the FOSTER PARKER connected the steel lifting strap to the 2 inch messenger wire. This was not done according to the rigging plan which stated that the 2 inch messenger was to be connected to a 4½ inch pendant. The error did not become apparent until the lifting strap was rigged, sent overboard and held by the main hook on the FOSTER PARKER. Re-rigging would consume valuable time. With deteriorating weather conditions, it was decided that the crew would continue pulling the strap with the 2 inch wire and the 4½ inch pendant would be connected when the strap was under the wreck.

Using the middle hook with the boom topped down, the FOSTER PARKER pulled on the strap from the starboard side for approximately one hour. Little progress was evident. A visual check by the diver confirmed that the strap was positioned properly but was apparently stuck, possibly on the wire rope or anchor chain.

The tug, MISTER RICHARD, was moved into position in an attempt to pull on the 2 inch wire at a more advantageous angle than that allowed by the middle hook of the FOSTER PARKER. The wire was passed to the tug but due to a combination of heavy seas, tension on the wire and the proximity of SEWOP this scheme had to be aborted.



A diver prepares for underwater operations.

Late in the day, the Marine Safety Officer (MSO), Galveston Coast Guard informed the Salvage Master that the mooring anchor that had been placed in the entrance channel would have to be cleared. In addition, the anchor removal resulted in a delay of approximately an hour at a critical point in the rigging operation.

Finally, the lifting strap was pulled through the tunnel by the D/B FOSTER PARKER. Because there was not enough reach to allow the 4½ inch pendant to be shackled to the strap on the deck of the SEWOP, it was necessary for a diver to make the connection underwater.

This was an extremely demanding operation for the diver. The shackle pins for this job weighed 80 pounds. The shackles weighed 200 pounds each. With this considerable weight and the heavy seas, the success of this maneuver could only be attributed to the diver's strength and skill. At 0100 16 October, operations were secured with one end of the 4½ inch wire fastened to SEWOP and the other shackled to the lifting strap.

Several hours later, the rigging crew on the FOSTER PARKER completed the rigging of the forward strap and secured it to the barge. The after strap was properly pre-rigged with the 4½ inch pendants shackled to each end of the lifting strap. A diver retrieved the 1 inch after messenger and the derrick began to pull the 2 inch wire under the wreck. At that time the 1 inch wire parted, a mishap that would prove to cause almost a full day's delay in the operation.

A diver was immediately sent down to assess the situation. He determined that the wire had fouled on the railing and parted. Crew members attempted to re-establish a polypropylene messenger by inserting a probe through to the starboard side from the port side. However, the tunnel under the after section of the wreck was no longer accessible because the heavy storm and associated heavy swells of the past 36 hours had left a large deposit of silt.

Re-tunnelling would consume valuable time and with other obstructions under the wreck, there was no guarantee against further silting. With this in mind, the Salvage Master decided to lift the bow section on the forward strap and slip the 1 inch after messenger under the wreck using the crane on the SEWOP. At this point it became apparent that a significant delay was imminent. The Project Manager and the SUPSALV representative concurred that a second work shift should be added, including an Assistant Salvage Master and Salvage Foreman. From this time until the end of the operation, crews worked around the clock.

At 1200 the FOSTER PARKER took a strain on the main hook and began a 380-ton pull on the forward strap. The suction was considerable and it soon became necessary to increase the strain to 425 tons. Bubbles began to surface in different areas around the bow of the wreck, indicating some movement.

Lift tension was applied with a con-

stant force of 500 tons. The effects of the suction were overcome and a portion of the wheelhouse became visible at the surface. A diver entered the water and reported that the bow of the ship was approximately 3 feet from the bottom.

At this time the 1 inch messenger was emplaced under the after portion of the ship and connected to the 2 inch messenger. The SEWOP was repositioned approximately 20 meters north for a better pulling angle on the 2 inch wire. Once the pulling angle was corrected, the crew was able to position the 2 inch messenger wire with little trouble.

The plan was to take the 2 inch messenger aboard the tug and lift the front section of the wreck with FOSTER PARKER's big hook. The lifting strap was already in place on the port side of the derrick barge. The crawler crane would prevent the strap from running free when the tug began to pull on the messenger.

Both ends of the 4½ inch pendant and the forward lifting strap were then stopped off on the stern of the FOSTER PARKER. Two 300-ton spreader bars were rigged to the four pendant ends. Preventer cables were installed to keep the steel lifting straps from slipping.

The only major departure from the salvage plan occurred at this point. Originally, a two-hook lift was to be made with the derrick. Because Brown and Root was able to provide the 300-ton spreader bars, a configuration using one hook was agreed upon.

The spreader bars were rigged. Since the bow section had been lifted twice in the last 24 hours, suction was no longer a problem. A clean dead lift was accomplished with the entire length of the superstructure breaking clear of the surface just a few minutes after lifting was begun. The derrick maintained a lift of 530 tons with the wreck in a stable suspended condition alongside. The Salvage Master dispatched SEWOP to the disposal site designated by the Corps of Engineers to position a marker buoy and to stand by to assist.

Moving the EAGLESCLIFFE

The wreck was lifted until its keel was even with the keel of the D/B FOSTER PARKER. It was then snugged up and made fast to the stern of the FOSTER PARKER for the move to the disposal site.

After six hours underway, the EAGLESCLIFFE was lowered to the bottom at the disposal site; however, the wreck was lively. To stabilize it, two 4' X 4' weepholes were burned in the hold. This would accelerate silting.

The FOSTER PARKER cleared the wreck and the SEWOP departed for the Corps of Engineers dock.

The following day, the SUPSALV Representative expressed concern about the lively nature of the wreck and directed crew members to reattach the previously recovered starboard anchor. The Salvage Foreman and the SEWOP returned to the wreck site. The anchor was positioned and the chain was run through the EAGLESCLIFFE's hawsepipe and made fast to bitts on the forepeak. The remaining anchor chain was dropped into the #1 hold.

The SEWOP returned to the pier and began demobilizing. The salvage job was over. Despite the size of the EAGLESCLIFFE's forebody, the fact that it was embedded in mud and clay, and difficulties created by inclement weather, all problems were overcome. The forebody was safely deadlifted and transported to the disposal site. Salvage operations and demobilization were completed by 19 October 1983.

Lessons Learned

The Salvage of M/V EAGLESCLIFFE afforded the Navy SUPSALV the opportunity to try techniques and pieces of equipment for the first time. The Self-Elevated Work-Over Platform had never been used in Navy salvage work before. The single point lift of over 500 tons was also unique. The success of the operation and lessons learned as a result can be added to the store of Navy salvage knowledge and applied to future operations.

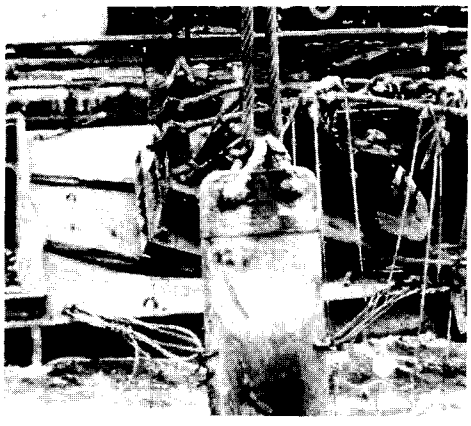
Perhaps the most useful piece of equipment for this project was the SEWOP WALTER REETZ. Such a platform can only be used in water of limited depth, and is only available in certain areas, generally where offshore drilling is being done. However, this salvage crew learned that where SEWOPs can be used, they provide a comfortable and stable work space. During this particular operation, when wind and large swells were a constant problem, SEWOP made surface tasks much easier to complete.

Due to a lack of information on the EAGLESCLIFFE's structural strength, it was essential to find a way to assure that her hull would not be cut by wires. The 4 foot wide steel plate strap provided that assurance and its successful use will perhaps be replicated in Navy salvage operations of a similar nature.

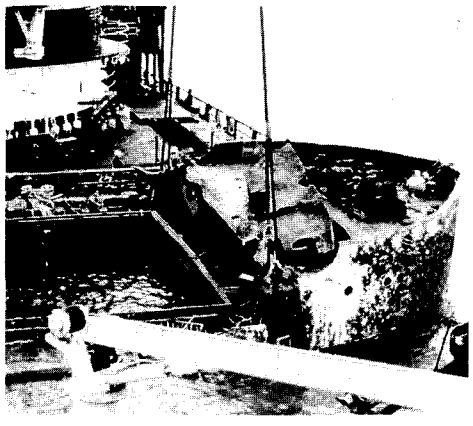
Another lesson learned from the salvage of the EAGLESCLIFFE is the advantage of lifting one end of a wreck at a time. The dead weight of the wreck had been estimated accurately at 550 tons. The maximum strain that could have been applied by the FOSTER PARKER was 650 tons. However, the combination of dead weight and suction would probably have been more than the derrick could sustain, had an attempt been made to lift the entire wreck at once.

The salvage crew originally planned to lift both forward and aft straps simultaneously. With the changes in the salvage plan, however, it became necessary to lift the bow section only. This required a sustained lift of 500 tons. The change of plans proved to relieve a significant amount of strain during a critical phase of the operation.

The salvage of the EAGLESCLIFFE was completed successfully and within budget, making the entrance channel to Galveston Bay safe for navigation. The entire survey and removal operation was completed in 15 days. Much of the credit for the success of the operation goes to Mr. Leon Ryder, CWO-4, USN (retired) Salvage Master, and Mr. Jim Jacobs, Project Manager. Both men are currently employed with Tracor Marine.



The stern above water.



The bow of the EAGLESCLIFFE is raised.

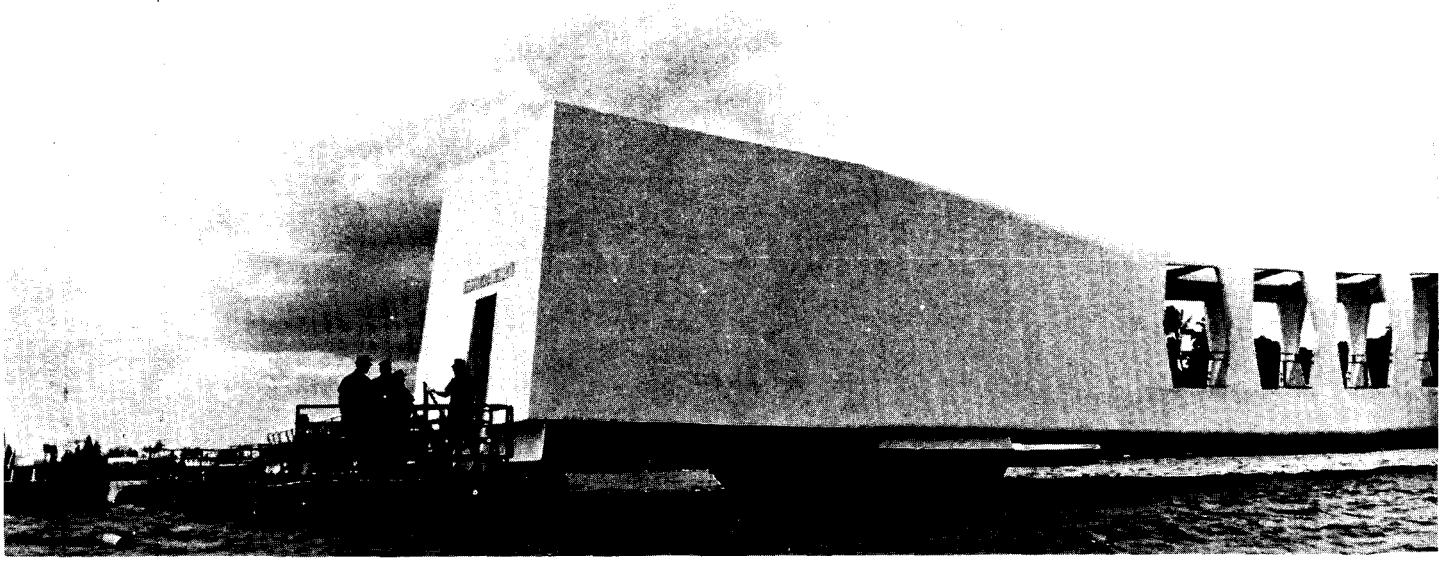
Ordnance Survey on the USS ARIZONA

LT J. M. Schumacher
Explosive Ordnance Disposal Mobile Unit ONE

When the USS ARIZONA was sunk during the Japanese attack on Pearl Harbor 7 December 1941, her flag was still flying. The ARIZONA thus became an inspiration to American fighters throughout World War II. In early 1950, the National Park Service, through Congress, established a permanent memorial at the site of the sunken battleship. She has never been decommissioned and flies our country's flag as proudly today as she did on the day she went down.

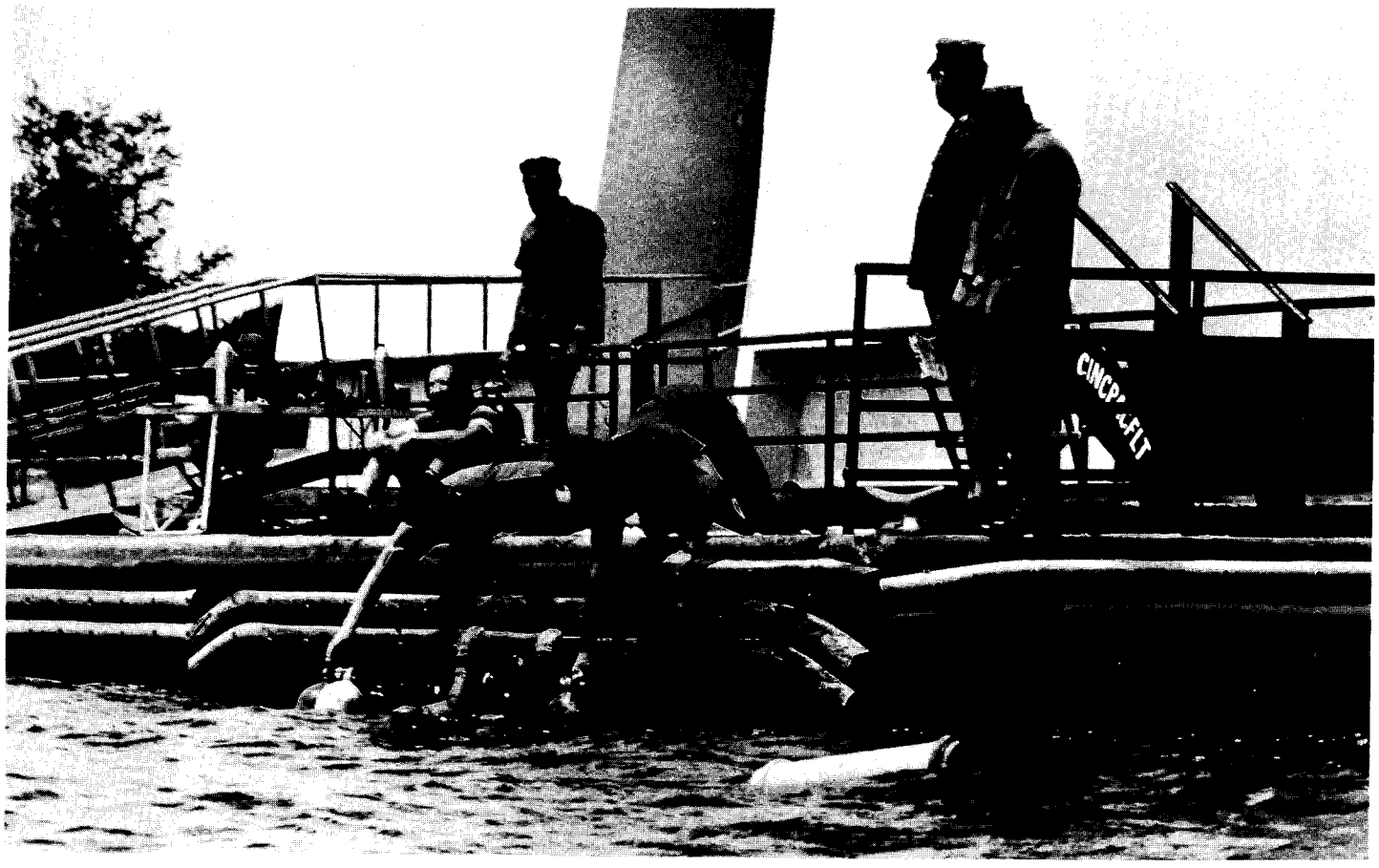
Since that time, the ARIZONA has not been disturbed except for removal of some valuable weapons and fuel immediately after she sank. Even when the memorial was built, it was designed as a totally independent structure which strides across the ship. Therefore, no close examination of ARIZONA has been done, and questions remain as to why this first line fighting ship went down so quickly.

To begin to answer these questions, Explosive Ordnance Disposal Mobile Unit ONE, under the command of CDR Fred Rotzler, was tasked with conducting an ordnance survey on the ARIZONA and the surrounding harbor bottom. The Park Service allowed three days in which to complete the diving operation. With consultation from Chief Ranger John Martine, Department of



(Upper left) A 5 inch 38 MK V illumination round with a MK XVIII mechanical time fuse, found during the survey. (Above) The USS ARIZONA Memorial at Pearl Harbor.

Members of the ARIZONA ordnance survey team. From left to right: A01 (DV) Arnold, MM3 (DV) Ritchie, IC1 (DV) Oliver, STG2 (DV) Schulz, QM2 (DV) Pratt, LT Schumacher, HT2 (DV) Lapo.



Divers search for Ordnance at the base of the ARIZONA Memorial.

A 5 inch 38 MK V illumination round still in its shipping container. Dive knife is 12 inches long.

LT Schumacher removes sea growth and corroded portions of the shipping container. The Ordnance is unarmed.

the Interior's technical expert on the memorial, plans were made to use a jackstay from ARIZONA's hull to a point 25 feet away. The decks were examined separately.

CDR Rotzler made the first port-side dive to the stern of the ARIZONA. Visibility, which had been anticipated to be a problem, proved excellent. The operation proceeded slowly without incident, as the ship's decks and sides were littered with debris, such as spent 30mm (Japanese aircraft) rounds and spent 40mm casings (U.S. anti-aircraft rounds), from the Japanese attack. In his search, CDR Rotzler discovered two U.S. 5 inch MK V illumination rounds still in their shipping containers on the main deck near the number three 14 inch gun turret.

In the search on the starboard side, silt between the ARIZONA and Ford Island impeded visibility. This exploration yielded one 5 inch common MK XV Mod 14 target practice (B.L. & P.) round. It was fused to the deck near the number two 14 inch gun turret. In their efforts to recover the MK XV Mod 14 round, divers discovered another underneath it. Apparently, they were stacked on the deck and when the number two gun turret exploded, they were buried and partially fused to the deck. Both were recovered without incident.

Divers made one surprising discovery. They found the number one gun turret partially intact, with all three 14 inch barrels present. There had been no record of its existence.

The ordnance survey was concluded on schedule, with all ordnance turned over to EOD personnel assigned to the EOD Group ONE Hawaii Detachment for final disposition. The remainder of the survey is to be completed by divers from Navy Mobile Diving and Salvage Unit ONE in Hawaii and a special diving team from the Park Service. They will attempt to discover why the ARIZONA sank so quickly and to develop plans for the preservation of the memorial.

Divers found the ordnance survey of the ARIZONA to be a rewarding experience. In CDR Rotzler's words, "As you pass down the hull, with all those black empty portholes staring at you, you can't help but feel that the ship is still alive, and you are a part of the horror and tragedy of that Sunday morning."

The following personnel from EOD MU-1 participated in the ARIZONA Ordnance Survey:

CDR Rotzler
LT Putre
RMC (DV) Libby
AO1 (DV) Arnold
ICI (DV) Oliver
BM2 (DV) Bruns
HT2 (DV) Hall
HT2 (DV) Lapo
STG 2 (DV) Schulz
QM2 (DV) Pratt
TM2 (DV) Harwood
TM2 (DV) Machanin
MM3 (DV) Ritchie

LT Schumacher, Dive Officer
BM1 (DV) Harris, Dive Supervisor

SUPERVISOR OF SALV

Since Commodore Sullivan began to organize Navy Salvage Operations during World War II, 16 men have held the title of SUPSALV. Of the 16, 3 — CAPT B.E. Manseau, CDR W.M. Bjork and CDR J.P. Lehan — are deceased. The remaining former SUPSALVS have undertaken a variety of Navy assignments, business ventures and other activities. As they contributed to the development of valuable salvage services while SUPSALV, each has continued to demonstrate leadership, determination and ingenuity. They remain influential in ocean engineering, Naval architecture, salvage, diving, offshore oil drilling and other fields. The following are current profiles of these men.

RADM William A. Sullivan

The first SUPSALV, RADM Sullivan, is now 90 years old, and is retired in La-Jolla, CA. In spite of emphysema, bronchitis, pneumonia and other respiratory illnesses, he is spending some time each day writing a Navy salvage history. The first installment of his article, "The History of Navy Salvage," in this issue of FACEPLATE, is excerpted from research he has completed over the last few years. RADM Sullivan was an honored guest at a reunion of World War II Salvage divers in Milwaukee last fall.

CAPT John Zabilsky

In April 1948, CAPT Zabilsky relieved CDR Sullivan and CAPT Manseau as the Navy Supervisor of Salvage. He left that post in August 1950 to take an assignment as the Commanding Officer of the Yokosuka Shipyard in Japan, and held that position throughout the Korean Conflict. He then returned to the Navy Department's Bureau of Ships to "supervise the Supervisor of Salvage." He was responsible for building and maintaining ships. He was later assigned the position of Supervisor of Shipbuilding at the Naval Base in Camden, New Jersey. This was his last tour in the Navy. CAPT Zabilsky retired to spend a short time building ships at a commercial shipyard, and since then, has been fully retired in Annapolis, Maryland. "I'm having a good time" he says, "playing golf and traveling to visit my family."

CAPT J.E. Flynn

CAPT Flynn was Supervisor of Salvage from August 1950 to January 1952. At present, we are unable to reach him. Any information concerning his location and current activities would be sincerely appreciated. (Please send letters to the editor of FACEPLATE.)

CAPT James W. Greely

Relieving CDR W.M. Bjork as Supervisor of Salvage in July 1954, CDR Greely remained in that post until May 1957, after which, he retired from the Navy. CAPT Greely moved to Morgan City, Louisiana where, he says, "the offshore oil drilling business got started." He joined the Kerr McGee Corporation and worked in offshore drilling operations. In 1964, he moved to Kerr McGee's Oklahoma City office, where he became Vice President in charge of design and construction of mobile offshore drilling units, including semi-submersible and jack-up rigs. In 1976, CAPT Greely retired from Kerr McGee and since that time, he has been an independent consultant for Searle Consortium, Ltd., which is headed by another former Supervisor of Salvage, CAPT Willard Searle, Jr. CAPT Greely is a specialist in oil rig and platform salvage.

CAPT W.L. (Scotty) Marshall

CAPT Marshall relieved CDR J.P. Lehan as Supervisor of Salvage in September 1959. He left SUPSALV in 1961 to become Head of Contract Design at the Bureau of Ships, and later Commander of the Navy Shipyard in Guam. In 1965 CAPT Marshall became Head of Logistics for the Navy's Cruiser/Destroyer Force, a job he describes as "rugged, but interesting." His work included repair, overhaul, supply and ordnance for 160 ships. CAPT Marshall retired from the Navy in 1966 to become Vice President and General Manager of the newly organized Murphy Pacific Marine Salvage Company, which had recently bought out Merritt-Chapman and Scott. After two years, CAPT Marshall moved to Honolulu to become Manager of the Dillingham Shipyard and use his expertise in naval architecture and ship design. Three years later, CAPT Marshall formed his own business designing and inspecting ships. He moved to the Campbell Shipyard in San Diego. When the yard was sold in 1979, he began consulting on a part-time basis. He is semi-retired and is an avid tennis player.

CDR Theodore Bacheler

CDR Bacheler was Supervisor of Salvage from 1961 to 1964, and his duties as SUPSALV included serving as a member of the CNO's Technical Advisory Group to study the sinking of the nuclear submarine, THRESHER. This project, he says, "was the beginning of a new era in diving equipment and deep work." CDR Bacheler retired from the Navy in 1964 and since that time, has worked on numerous salvage and ocean engineering projects around the world. From 1975 to 1978, he was a Senior Ocean Engineer at Stanwick International in Iran where he performed ship maintenance and repair. In 1978 he joined the VSE Corporation as Head of their Integrated Logistics Support Department. CDR Bacheler went to Saudi Arabia in 1981 to work with Bethship International as Production Manager and Plant Engineer. He is currently with the Lexington Park, Maryland office of COR, Inc., a firm specializing in naval logistics, naval architecture, ocean engineering, command and control communications and ship systems design. He is managing a project to modify controllable pitch propeller systems on 400-foot polar icebreakers for the Coast Guard.

CAPT Willard F Searle, Jr.

The tenth man to hold the position of Supervisor of Salvage was CAPT Searle, who served from 1964 to 1969. He then became a Project Manager in charge of the design and construction of salvage ships, including the ATS, ASR 21 and 22, tugs, auxiliary craft and mine craft. He retired from the Navy in 1970 and since then has focused his efforts in three areas: teaching, committees and professional organizations and Searle Consortium, Ltd., International Consultants in ocean engineering, ship salvage, diving, towing and explosives.

/AGE UPDATE

Helen Bebout
NAVSEA Publications Assistant

He has held visiting professorships at the Massachusetts Institute of Technology, the Maine Maritime Academy, Webb Institute of Naval Architecture, New York State, Massachusetts and California Maritime Academies, Scripps Oceanographic Institute and the University of California at Berkeley. He is a member of the Marine Board of the National Academy of Engineering, Society of Naval Architects and Marine Engineers and other professional organizations. Currently he is Chairman of the Society of Naval Architects and Marine Engineers' Panel on Salvage and Rescue Towing and the Marine Technology Society's Committee on Marine Salvage and Towing. He was elected to the National Academy of Engineering in 1982. CAPT Searle is Chairman of Searle Consortium, Ltd. He provides leadership and acts as general director.

CAPT Eugene B. Mitchell

CAPT Mitchell was named Supervisor of Salvage in May 1969, and remained there until September 1973. Upon retirement from the Navy, he worked as a private consultant. Some of his projects were with Global Marine Development Corporation, which offered him a full-time position in 1976. Global Marine, based in Newport Beach, California, works in oil drilling and salvage operations worldwide. CAPT Mitchell is currently a Project Manager, supervising several of the company's contracts. Recently, he has been in Japan, developing an oil drilling rig to be placed in the Arctic.

CAPT J. Huntly Boyd, Jr.

In 1973, CAPT Boyd became Supervisor of Salvage. During his watch, and under his direction, the Suez Canal was cleared of several ships, pontoon bridges and an earth causeway. This was one of the largest and most difficult clearance operations the Navy has undertaken. He received the Distinguished Service Medal for his leadership on that project. In May 1976, CAPT Boyd left SUPSALV to become the Planning Officer at the Norfolk Naval Shipyard in Portsmouth, Virginia. From 1979 to 1981, he served as Commanding Officer of the Puget Sound Naval Shipyard in Bremerton, Washington. He then retired from the Navy and returned to Washington, D.C. as a private consultant with Searle Consortium, Ltd., where he specialized in ocean engineering and salvage engineering projects. His work involved fleet maintenance, logistic support and dry dock salvage. Recently, CAPT Boyd took a full-time position with Booz-Allen and Hamilton in Alexandria, Virginia, as a consultant in general marine fields and ocean engineering.

CAPT Robert B. Moss

From May 1976 to June 1979, the Office of the Supervisor of Salvage was headed by CAPT Moss. By that time the scope of the office had expanded greatly to include a Navy-wide network of reserve salvors, who continue to provide tremendous mobilization resources. CAPT Moss regards the position of SUPSALV as a unique opportunity for innovative thinking. During his tenure, he especially enjoyed quarterly conversations with engineering duty officers, who responded with interest and enthusiasm to a variety of salvage scenarios. When he left SUPSALV, CAPT Moss became the Inspector General for NAVSEA, which he describes as, "an opportunity to get an intimate view of the whole of Naval Sea Systems Command." He was responsible for triennial Command inspections of all NAVSEA activities, including shipyards, weapons and ordnance stations and special activities, such as the Navy Experimental Diving Unit. He was also in charge of conducting Command investigations, with the goal of eliminating waste and fraud. During his tenure as Inspector General, NAVSEA's first criminal investigator was hired. In June 1983, CAPT Moss retired from the Navy. His home is in Alexandria, Virginia.

CAPT William N. Klorig

CAPT Klorig had a brief assignment as Supervisor of Salvage from June 1979 to September 1979. He left that position to become Logistics Manager for amphibious and combat support ships, including ARSs, ASRs and tenders. Currently, CAPT Klorig is Director of the Depot Improvement Program under the Industrial and Facilities Management Directorate at NAVSEA, where he is in charge of improvements in ship overhauls. This is accomplished through support to shipyards, assuring that they have personnel, equipment, space and technical assistance adequate to complete their assignments. He also reviews overhaul planning and methods at shipyards. CAPT Klorig, who retires from the Navy in February 1985, will maintain an active interest in ocean engineering.

CAPT Colin M. Jones

The position of Supervisor of Salvage was occupied in February 1979 by CAPT Jones. He remained at NAVSEA until April 1982, when he accepted an assignment as Production Officer at the Naval Shipyard at Pearl Harbor. Following a heart attack in February 1983, he retired from the Navy in October 1983. Though still recuperating, he is doing some private consulting. One of his projects, with NAVSEA, is the analysis of welded chain and welded chain failures. Another, with a research corporation at the University of Hawaii, concerns ocean thermal energy conversion (OTEC). CAPT Jones is also an engineering specialist with the Searle Consortium.

The Office of the Supervisor of Salvage has been occupied by a series of dedicated and creative men. Under their leadership, SUPSALV has organized and participated in such operations as harbor clearances during World War II and the Vietnam conflict, the clearance of the 100 mile Suez Canal and numerous ship salvages. As these men have moved to other positions, or retired from the Navy, they have continued to contribute valuable knowledge to diving and salvage fields. Some have used their expertise for offshore oil drilling. Several consult on shipbuilding, salvage, ocean engineering, towing and diving projects. Others share their knowledge and experience through teaching. All, both during and after their work at SUPSALV, have increased the salvage capabilities that are such an integral part of the U.S. Navy.

NEDU REPORTS

Evaluation of the EFCOM UB/UDR-54 MARK TRAK Underwater Locating System.

Edward S. Morrison
NEDU Report 12-83
Abstract:

In June 1982, the EFCOM UB/UDR-54 MARK TRAK underwater locating system was evaluated by the Navy Experimental Diving Unit (NEDU). The purpose was to determine the system suitability for U.S. Navy diver use in providing a low cost, easy to use and maintain alternative to marking and tracking units currently used by the Fleet.

The EFCOM MARK TRAK proved to be a sound and reliable system requiring little diver training before use. Human engineering aspects of the MARK TRAK were good and no material failures were encountered during the test. The units entirely fulfilled manufacturer's specifications. The EFCOM UB/UDR-54 MARK TRAK underwater locating system is considered to be an effective system of marking and tracking an underwater object for the U.S. Navy diver.

Evaluation of BAUER MARINER "D" High Pressure Breathing Air Compressor

Stephen F. Wargo
NEDU Report 11-83
Abstract:

In July 1982, the BAUER MARINER "D" high pressure air compressor tested by the Navy Experimental Diving Unit in response to Task No. 81-12 from NAVSEA OOC-3 to Commanding Officer, NEDU, Subject: Test and Evaluate Bauer "Marine" HP Compressor (3200 psig/7 ACFM/wt 280 lbs.), 27 April 1981. The purpose of this test was to determine if the equipment was suitable for use by the U.S. Navy diving community.

The BAUER MARINER "D" met manufacturer's specifications for quantity of air produced with a quality which met or exceeded purity standards. The design and engineering were determined to be adequate as no material failures were encountered during testing.

The BAUER MARINER "D" is considered to be suitable for U.S. Navy requirements for compressors of this size and type.

Evaluation of Digital Diving Watches

Edward S. Morrison
NEDU Report 2-83
Abstract:

In March/April 1982, NEDU evaluated a selection of diving watches utilizing a digital display window. The purpose was to find suitable digital watches for use during U.S. Navy diving activities. The watches tested had similar methods of activation and integral light, except the two analog types which had no integral illumination but were fitted with elapsed time bezels.

Testing encompassed suitability, durability, pressure, thermal stress, luminescence and magnetic signature tests. Throughout testing the watches performed adequately with the exception of the magnetic signature tests. Based on information gathered during testing the watches are considered to be reliable time keepers, robust and suitable for use by U.S. Navy divers.

Manned Evaluation of the MK-15 UBA Canister Duration in 13°C Water Using a Resting Diver Scenario

J. L. Zumrick, Jr., CDR, MC, USNR
NEDU Report 2-84
Abstract:

The CO_2 absorbent canister duration of the MK-15 closed-circuit Underwater Breathing Apparatus (UBA) was evaluated using a resting diver scenario in 13°C water at 65 FSW. The Passive Diver Thermal Protection System (PDTPS) was worn during the study. Results demonstrate that the safe operational limit of the MK-15 UBA for a diver mainly at rest in 13°C water is 321 minutes.

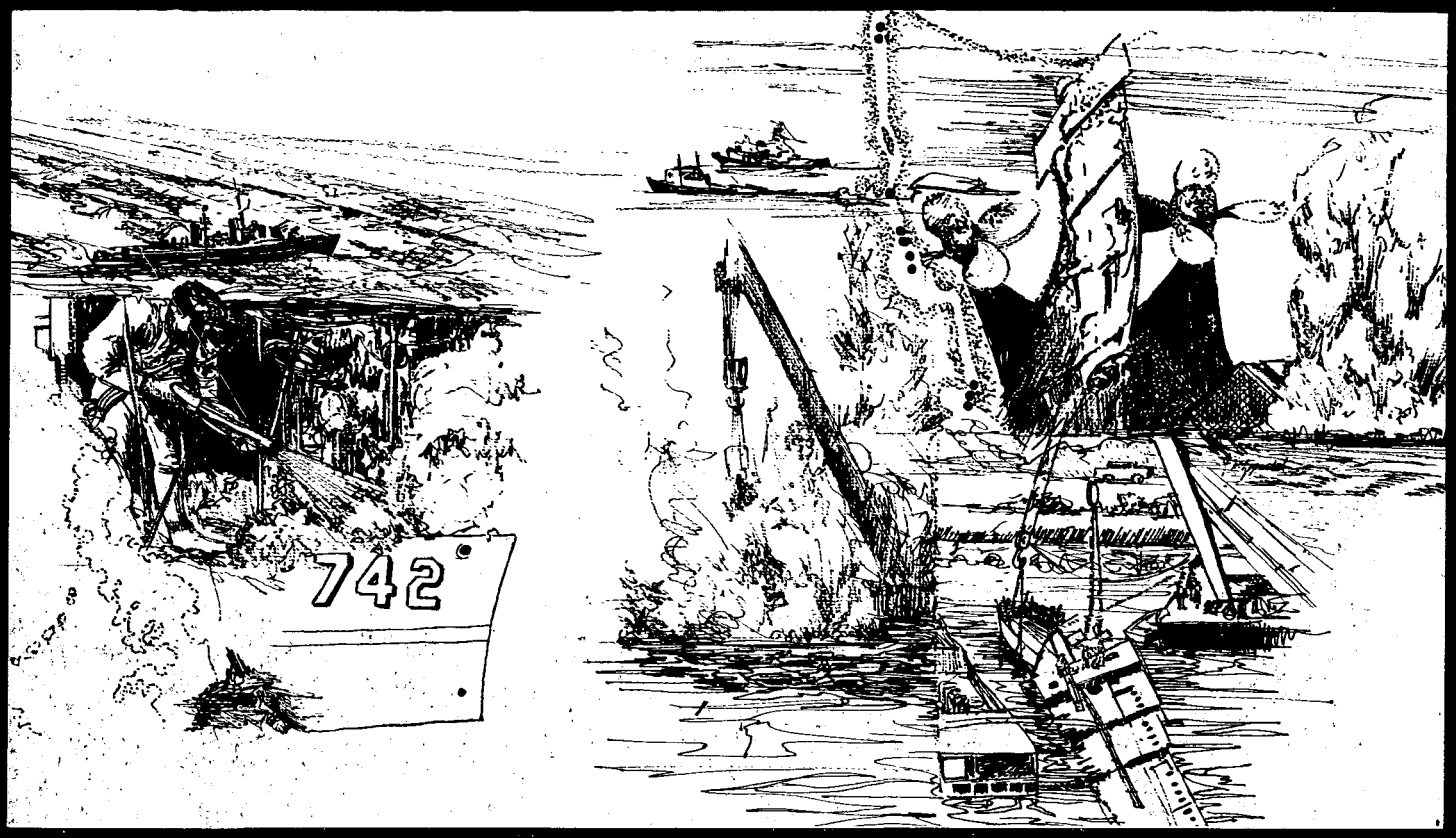
The OLD MASTER

TMCM(MDV) Bill Gholson

Panic kills! It is a blind, unreasoning fear that affects people in different ways. It prevents logical thinking and action, blocking those responses necessary to cope with a difficult or dangerous situation. Recognizing the reality of panic is one of the best ways to cope with it. I feel a sensation like nausea rising up through my body and I have learned to control it in the same way—by clamping my jaws tightly and forcing the feeling back down while thinking slowly and deliberately about the situation at hand. All divers must learn to recognize their own signs of approaching panic, and as they begin to force their fear downward, they should make a step-by-step assessment of all the factors, good and bad, in their situation.

If there is time to consciously realize the onset of panic in a crisis, then there is hope to correct the situation. A diver who is thoroughly prepared or experienced is in the best position to control panic. It is therefore essential to make a detailed plan of each diving job and review the corrective action to be taken in emergency situations. Train yourself and your crew by periodically conducting casualty drills. Preparation gives time to think as the immediate situation changes. When a prepared diver evaluates circumstances as they really are, there is always a glimmer of hope. The realization of some small chance of overcoming the crisis makes it possible to conquer panic. The strong human mind requires only a small amount of hope as a foundation on which to build a life saving situation.

Remember—thorough preparation and experience build confidence, and confidence in one's abilities always reduces the tendency to panic. It may save your own or a fellow diver's life some day.



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