



Sun Ship Tug



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Sun Shipbuilding & Dry Dock Company

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TIGHT DELIVERY NET



A truck loaded with a two-ton weight was used to test local deflections on the deck of the completed 89' unit. Half of the second 89' unit is in the background.



Two small "Doc Ammi" pier sections in the raised position in the surf at Virginia Beach. Winches and hoisting gear are still in place on the inshore unit. The ramp in foreground was not part of contract.



Pier section "Wop on stiffs" at Little Creek, Virginia, Winched and hoisting it up are shown on the deck.

Pier Sections "Quick" Job

In a total of 40 days—from contract to delivery—Sun Ship built and delivered four orthotropic pier sections. An astounding record in itself, complicated by delays in steel deliveries and other problems, Sun Ship actually delivered the first two of the four pier sections two days ahead of schedule. The second two pier sections were delivered on June 20 to the Naval Facilities Engineering Command, Little Creek, Virginia, meeting the contract of 40 days with a two day allowance for extra work added during the contract. The promptness with which Sun Ship delivered the order enabled the Navy to begin early testing of the units; as a result, Sun Ship is now in a good position to bid on future orders of the "Doc Ammi" piers.

Construction

Named after their designer, Dr. Amirikian, two of the prototype barges were 116x28x6 feet deep while the other two are 90x28x5 feet deep. Each barge is fitted with six spud wells and contains 16 water tight compartments.

On these units the stiffener arrangement—bierated plates flanged at two points to form each "hat-shaped" stiffener—constitute one of the unique fabrication features that provide a strong, lightweight structure. At the start of production, these bierated stiffeners were burned from flat plate in the Fabricating Shop and formed in the Boiler Shop.

Fabrication of the hulls was accomplished in the high bay of 47 Shop. In building the larger two pier sections, the hulls were each constructed in three hull subassemblies. The smaller two units were constructed in two hull subassemblies. Upon completion of all subassembly work in the shop, the units were transported to the head of 8 Way where they were aligned and welded together into the finished pier sections. After testing and painting, they were lifted by two big gantry cranes north of 8 Way and transported to water at the north side of No. 3 dry dock pier. The first two units were towed by tug to Little Creek, Virginia, carrying the four hoisting winches and other equipment as a

deck load. Similarly, the second two units followed.

After arrival at Little Creek, Virginia, the first unit was successfully raised up on its six legs, several feet above the water, using the hand winches and a block and tackle arrangement. The lifts were easily accomplished, even though the basic barge weighed about 75 tons, including the winches and other gear aboard during the lift.

Use of a number of experiments has since been made by the Seabees showing the versatility of the pier sections. For example, to show its use as a harbor transport craft, one unit was fitted with a diesel outboard engine and then deck loaded with six bulldozers. Another was fitted out as a dry dock using the spuds driven through the wells as guides in the raising and lowering operations. Small, flat bottom "V" units have been lifted out of the water using a compressed air system. Other experiments included setting up several of the units as a causeway under surf conditions in shallow water. The pier sections were also studied for use in side loading on LST's.

The prompt delivery by Sun Ship combined with a successful test and evaluation program by the Navy indicate the possibility of a future procurement of these units.

Older Worker Citation

Sun Ship was awarded The American Legion of Pennsylvania's "Older Worker Citation" in ceremonies on July 14 at Harrisburg. Selected from a long list of nominees screened by a committee headed by Aloysius T. O'Donnell, Department Employment Chairman who also presented the plaque, Sun Ship was honored on the basis of its excellent record in hiring workers over 45 years of age. Other area employers also cited for their record of employing veterans were the Scott Paper Company, Charter-Ebblystone Plants; the L. Robert Marshall Consulting Engineers of Ebensburg; and Richard A. Rosenberg, Deputy Director of the Pennsylvania State Civil Service Commission.

The award to Sun Ship was actually made by the National Economic Commission of the American Legion, through the Legion's Department of Pennsylvania, to the Pennsylvania Company "for the excellent record of the company in hiring workers over 45 years of age." The winner was disclosed in an announcement by State Commander Harry V. Klein, Jr.

In making the announcement, Commander Klein declared that "the policy of the company has always been to hire the man on a job for the excellent and understandable ability to perform the job required."

"This Company has also had a continuing policy in the application of retraining programs during the past year in which large numbers of new workers were trained in a manner that placed no age restriction on acceptance for training."

Commander Klein pointed out that "the growing number of workers in the over-45 years-age group makes necessary the utilization of these workers in the labor force to maintain the strength of our economy . . . it is essential that this country make full use of the years of experience and skill represented by the so-called Older Worker group of workers . . ."

The award was formally presented to Sun Ship during the Legion's 48th Annual State Convention, held in Harrisburg, Pa., July 20-23. Mr. Rainback, Personnel Manager, accepted on behalf of the shipyard.

ONCE A YEAR APPEAL

The official industry-wide kick-off for the Annual United Fund Drive took place September 15 across the Nation. Once again, as in the past, Sun Ship is striving for 100 percent participation in this most worthwhile charity, and a record-setting year in amounts pledged. These goals, of course, are entirely dependent on the continued cooperation of all Sun Ship employees.

In the past, Sun Ship employees have always been generous. This generosity has resulted in increased services being available to employees and their families by the agencies supported by the United Community Fund of Chester and vicinity. Several of the organizations are now able to contribute substantially to Sun Ship employees, to name a few, the Crozer Chester Medical Center, Red Cross, United Cerebral Palsy, and the YMCA of Chester have provided aid when needed at little or no expense to employees. Blood, emergency medical care, housing assistance—all of these benefits are only possible through the efficiency of one central collection agency, the United Fund. Area of residence is not a discriminating factor to be eligible for aid. When blood or medical care is essential, it is available.

To maintain its growth and improvement, a healthier business community deserves a fair share of your charity. The community from which you support your family needs a portion of your support reinvested in it.

Remember, too, that while all of the charities must meet rigid standards before being accepted by the United Fund, you may elect to specify your contribution for your favorite charity.

For the good of your fellow-employees and your business community, please continue your generosity.

SHIPPY FEATURED IN TEXTBOOK

A new version of the textbook "Men at Work in the Mid-Atlantic States," to be published in the near future, features a chapter on Sun Ship. This book, a standard science textbook for youngsters between 8 and 12, was originally published in 1960 and at that time, eight pages were devoted to our shipyard. Now, six years later, chapter 22 on "How Ships are Built" is being brought up-to-date to include such notable Sun Ship achievements as #3 dry dock, automated ships, and the MST5 RO/RO. The latter, designated as Hull 646, has a propulsion unit consisting of two modified jet engines connected to four turbines for speeds up to 27 knots.

The original edition was illustrated with a photo of the "Pennsylvania Sun." In the revised copy, it will be replaced by a photo of a Grace Line launching. Authored by Henry Lent and published by G. P. Putnam's Sons, it is one of a series of books describing major industries and products of various areas of the U. S. Still being widely used in schools and libraries, it is at the request of educators who have found the book so good that Putnam decided to release it in a completely new, updated edition.



Mr. Rainback accepts citation awarded Sun Ship by American Legion in Harrisburg on July 22.

Trial Success

The Sun Ship-built "Santa Cruz" completed a successful trial run on July 19-20. Departing from the shipyard at 9 a.m. Tuesday, she returned to her builders at 8 p.m. the following day with operation reported to be highly successful. In particular, so difficulties were experienced with the centralized control.

The second of the three under the Grace Line contract, the "Santa Cruz" was delivered to her owners on August 18.

520 ELEVENTH AVE
PERSPECT PARK PA



50 YEARS OF GUARANTEE

by Sterling Bechtos

At the time Sun Ship opened for business 50 years ago and launched the "S.S. Chester Sun," Hull 1, on October 30, 1917, a specialized group of engineers was introduced into shipbuilding. Charged with guaranteeing the operation of each ship after delivery and protecting Sun Ship's interests, the guarantee engineer has always been an important factor in the over-all yard operation. However, in 50 years of operating in the Yard, their duties and qualifications have changed as radically as ship design.

Initially, most guarantee engineers were enticed from Scotland and Ireland like most of their early counterparts in the other shipbuilding crafts during the advent of American shipbuilding. Fifty years ago and for an extensive period thereafter, the guarantee engineer was responsible for installation of the heavy machinery during outfitting operations. Alignments, setting bearings, setting engine valves, bolting out boilers, lighting off and preparing the ship for dock trials were also among the duties. Every major item had to be inspected and passed by the Guarantee Engineer, who worked directly with the Classification Society and Steam Boat Inspectors, and the owner's representative—generally the Chief Engineer assigned to the ship.

Second Phase

After dock and sea trials and with the owner's acceptance, the Guarantee Engineer boarded the ship the night before sailing. From that time until completion of her maiden voyage, the guarantee engineer was responsible for checking daily all of the ship's machinery, even during normal performance.

Suspected warnings of trouble were checked and double checked, in addition to complaints such as that from the Chief Mate, who was missing half his stores, to the Chief Steward who was short a pass-key, the cook a frying pan, etc.

At that time, to qualify for these responsibilities, the guarantee engineer held a U.S. Federal license as Chief Engineer of any tonnage. Sun Ship required further proof that its guarantee engineer had sailed as Chief sufficiently long enough to have acquired a reputation for being capable of keeping a ship on schedule.

When turbines and water-tube boilers crept onto the horizon of shipbuilding, Sun Ship moved to the forefront by obtaining the patent rights to build the Duxford opposed piston engine. Obtained from William Duxford & Sons in England, Sun Ship also purchased two World War I tankers and towed them from New Orleans. The turbines and two of the three screw boilers from each ship were removed. The remaining boiler furnished steam for the auxiliaries and pumping cargo. Sun-Doxford Engine No. 7500 was installed in the Aurora and 7501 was consigned to the Bidwell.

Qualifications Refreshed

At this stage, the Guarantee Engineer's qualifications were stiffened, he was now required to have both Chief of Steam and Chief of Diesel of any tonnage. Only two Guarantee Engineers were on the payroll. Sun Ship, through the USCG provided by the Navy changed the engineer's license from any tonnage to read "any horsepower." The Bidwell and Aurora after conversion from steam to diesel were designated "M.S. AURORA" and "M.S. BIDWELL," respectively. The M.S. or Motor Steam designation permitted a steam engineer with a Chief license to sail as First Assistant Engineer on the M.S. ships. After six months of satisfactory service, he could sit for the Chief of Diesel. Only the Chief Engineer was required to have both licenses. These two ships, therefore, became the training ships for many Guarantee Engineers.

Further complications arose in 1938 when the keel for the Sun Ship Hull 175 was laid. With this contract were introduced the U.S.M.C.'s Inspectors, Ship's Officers, Owner's Inspectors, Classifications, Extra USCG, Vendor's representative, and our own drawing room. Under this arrangement, the guarantee engineer no longer worked with just those engineers assigned by the shipowner. Guarantee items multiplied as a result, but the confusion was alleviated by the Second World War.

Second World War

The immediate need for T-2 Tankers forced the Government to appoint Standard Oil Esso to inspect these ships. The inspectors also handled the USCG and A.B.S. The Guarantee Engineer was relieved from delivery trips with the exception of delivering ships assigned to the Navy which represented trips along the coast from Chester to New York or Norfolk. In that period, 198 ships were built, equipped with the famous turbo-electric drives.

Decline

Shipbuilding declined for a few years after the war, while shipping rose. Merchant ships were towed to the Yard for overhaul, and the guarantee engineer's duties consisted of assisting and operating river trials during this era of shipbuilding. It was at this time that steel shortages appeared and the steel companies refused to sell to the Yard unless, in turn, the shipyard sold them scrap steel. The Guarantee Engineer was pressed into the scrap business. From Rhode Island to South Carolina, the guarantee engineer surveyed old government ships for sale. If Sun Ship was the successful bidder, the guarantee engineer accompanied the ship to the Yard for scrapping. In this period, the Guarantee Engineer also assumed weekend watches in the Yard.

Automation

With automation came many refinements to the work and qualifications of a guarantee engineer. Today, a guarantee engineer comes ashore after one or two years at sea to complete his education. Written, notepad and pencil notes sufficed, paper work has increased to the extent that it is the nucleus of the modern guarantee engineer. It has actually cut him in half, to the extent that a separate division was created. The Guarantee Engineer's old operating gang became the Operating Engineers with a separate division for guarantee items. There are three water reports, luber oil reports, followed by procedures, flushing procedure, bolting out, gear case cleaning. Every item requires a written procedure. Fortunately, automation also simplifies the 20 or 30 copies needed.

When at last the guarantee period expires, the Trial Board, Owner's Representatives, Design Agents, Ship's Officers, Vendors and many others are all involved. The completion of today's ships might well be measured in relation to the volumes of printed material needed to "clear" a ship.

Despite the workload the guarantee engineer still maintains an advantage—that of seeing and gaining more knowledge of the shipbuilding industry than perhaps any other individual.

MINE SHAFTS

An Old Sun Ship Product

Ten years ago, Sun Ship was contacted by New Jersey Zinc Company, a major mining producer, for a possible solution to flooding problems within their mines. Now one of the Yard's regular customers, New Jersey Zinc prior to that time had tried many methods for battling the threat of water in deep mines. Flooding in mine tunnels often results in the loss of sections of a mine or, at worst, causes the shutdown of an entire mine. In these situations, the lives of miners are frequently endangered.

Of the methods explored by New Jersey Zinc, only one proved unsatisfactory. The others, the last two involved sealing off tunnel sections with concrete and the use of rectangular doors installed in tunnel shafts to control flooding situations. Neither of these solutions was satisfactory and it was that is



78" diameter tunnel-type mine door for 778½ P.S.L. working press being installed in a stop at the Ogdensburg Mine.



Artist's conception of Vertol's Wind Tunnel.

Vertol Wind Tunnel

A neighboring industrial giant accepted Sun Ship's bid on August 17 to construct a wind tunnel for helicopter testing. To be installed when completed at the Boeing complex opposite the Philadelphia Electric plant on the Industrial Highway, Sun Ship will build and erect the fan section at a cost of \$788,000.

Sun Ship's contribution consists of the fan housing about 39' ID x 77' long, inside of which is contained the nacelle. The nacelle is an air foil-shaped housing, best described as a cross between an Air Force fuselage and a submarine hull, which holds motors totaling 15,000 HP. The fan section also houses other major equipment. All plate and structural shapes will be fabricated from A-36 steel in the Boiler Shop, R. Merriam, Industrial Sales, has been named Project Engineer.

The critical nature of the air flow from 5 to 280 knots in precisely-controlled increments. Of the V-STOL type, meaning that it is capable of duplicating both vertical and standard take-offs and landings, this particular tunnel will be used for testing helicopter models under development at Boeing's local plant.

The critical nature of the work demands that exacting tolerances be met in a very tight schedule. Since timing is an utmost factor, Sun Ship will fabricate the tunnel in sections, transport them to the Vertol site on the Industrial Highway, and assemble them—ally by July 1, 1967.

stage that New Jersey Zinc approached Sun Ship in 1956.

Designs

Assigned to the task, Karl Figgart and other members of our design department evolved a circular, bulkhead-type door which would withstand the necessary pressures and



Tunnel-type mine door consigned to Jefferson City, Tennessee Mine of New Jersey Zinc. View shows shipment preparations in Boiler Shop.

simultaneously satisfy the mine operators. Mine doors must be small enough to move through shafts and tunnels to the incident points, but they must also be large enough to allow the passage of equipment and ore. The bulkhead type door satisfied all conditions and, in the next few years, Sun Ship produced over 40 such mine doors of this design for New Jersey Zinc.

The bulkhead type design has since been refined by Sun Ship to a tunnel-type door. This design includes the hinged door, door frame, and a fabricated tunnel section that leads into the door frame.

Operation

With the advent of water problems, mine doors can be closed to seal off a section of the mine. After flooding, the water is pumped out, the mine doors opened, and production resumed. Tested under actual flooding conditions in New Jersey Zinc Company's mines in Jefferson City, Tennessee, one of these doors has withstood a pressure of 575 psi. The mine is once again in operation.

Latest Contract

Well received by the mining industry, at the present time our 50th mine door is being manufactured in the Boiler Shop. For Falconbridge Nickel Mines, Ltd., this 79" ID door will be installed at the 1,000 foot level in Ontario, Canada. The tunnel section into which the door is being installed also measures 79" ID. The door will be assembled in place with a flanged and bolted joint and is designed to withstand pressures of 440 psi. The use of the flanged door permits moving a large door in pieces through a narrow shaft to the mine. After installation, the larger door affords easier movement of ore as well as the use of larger machinery which just pass through the door to the work area.

These mine doors represent the Sun Ship, an original concept conceived by yard engineers and later translated by them into working drawings for manufacturing the equipment. As an industrial product tailor for a specific industry, mine doors will continue to be an important part of the manufacturing picture for Sun Ship in the years to come.



BLINDED! Yes, if Stacy Montgomery, 50-1283, pictured above holding the safety glasses which saved his right eye had been successful, while shipping hot slag from an overhead weld, a piece fell and pierced the right lens of his glasses.

Although some of the glass entered his eye, he did not sustain any injury. Had he not saved his right eye had been successful, while shipping hot slag from an overhead weld, a piece fell and pierced the right lens of his glasses.

Foreign Exhibit Planned

Invited by the U. S. Department of Commerce to participate in the Oceanographic Equipment Exhibition and Promotion at Frankfurt, Germany, November 2-9, 1966, Sun Ship is one of 35 successful firms across the country to be selected for this coveted opportunity. Representing an important opportunity to introduce U. S. production services in the field of oceanography to the European market, Sun Ship applied for and was granted one of the few available permits to exhibit issued by the Department of Commerce.

Highly selective in their choice of firms, judgment was based on two considerations: (1) Whether our particular abilities matched with the indicated European needs, and (2) Whether an industrial category such as ours was already planned.

Shipped construction
Sun Ship plans to exhibit models and photographs of the pressure hulls and test facilities that we have fabricated. Our accomplishments in the field of oceanography will be displayed in one exhibit. Equally, this exhibit will be a means for increasing our knowledge in Oceans R & D, particularly in the underwater petroleum field.

Areas Covered

The U. S. Commercial Exhibition is open to oceanographic instrumentation and equipment used in the following fields:
Petroleum/gas exploration and development
Meteorology
Tidal and river control
Navy operations
Ocean mineral and food resources development
Marine and civil underwater engineering and construction and harbor installation
Marine biology and geological oceanic research
Corrosion metallurgy
Fisheries research and fish farming
Underwater TV and movies
Desalination
Hydrography

Purpose

To boost American exports, this Department of Commerce is sponsoring the exhibit of American oceanographic equipment. The U. S. Trade Center, Frankfurt, Germany, was selected because of its central location to all of the maritime nations of Western Europe. Close by are the complete facilities of the Amerika Haus for meetings and papers which will be held in conjunction with the exhibit. In particular, the German market has become very important, partly because German Government and business have put oceanographic research and exploitation high on their list of priorities. Germany further uses the United States as its principal source of imports. Other European countries are likewise interested in products and engineering abilities that have been successfully demonstrated in the United States. Already, fully organized oceanographic programs in Europe have progressed beyond pure research to where numerous types of equipment, instruments, and systems are now required. Large orders are earmarked for the purchase of hardware and services in the various oceanographic fields.

Such an exhibit as this should provide Sun Ship a simple opportunity to increase its markets through a display of its ability to fabricate different pressure hulls, habitations, and enclosures.

Supervisory Development Graduates Honored



Members of the Third Supervisory Development Class, which began August 3. Standing left to right are Jack Harrington, Robert Galloway, and Frank Matthews.

The "Certificates of Achievement," awarded at a banquet held on July 13 at PMCs's Macmorland Center, honored the 41 graduates representing foremen, assistant foremen, and leaders throughout the shipyard who had completed the first supervisory development program.

Sponsored by Sun Ship under the overall coordination of Jack Harrington, Sun Ship's Training Supervisor, the first course covered a two-hour 15-week period of lectures. The graduation ceremonies featured addresses by Messrs. Matthew Johnson, Academic Dean and Vice President of Pa. Military College and W. Newton Keyser of Sun Oil Company's Industrial Relations Department and Director of their Evening Education Program. Mr. Galloway awarded the certificates.

With the third course underway on August 3, the Supervisory Development Program is guiding Sun Ship's personnel toward improved supervisory techniques. Other recipients of the first "Certificates of Achievement" besides Henry Johnson pictured below were:



Presentation by Robert Galloway, Vice-President of Operations, to Henry Johnson, Department Leader, and one of the 41 graduates of the First Supervisory Development Program. At right, "Certificate of Achievement" is Professor Frank Matthews.

Research Sub at North Yard

Sun Ship is the proud possessor of a sub-contract from Lockheed Missiles and Space Company for a three-sphere pressure hull to become a part of the Deep Submergence Rescue Vehicle. The contract calls for two tripartite units, one for the DSRV and the other to be tested to destruction. Other portions of the contract include transfer tanks and rescue airt.

DSRV will be used primarily to recover personnel from distressed or sunken submarines. The craft will ride piggyback fashion aboard a mother nuclear submarine to the scene of the disabled submarine, where it will dive and be mated to the stricken sub. Survivors from the sub can then board the DSRV undersea. The craft will have an operating depth in excess of 4,000 feet and a speed of 3 knots for a 12 hour period.

This contract is a follow-on to the Deep Quest (two spheres) pressure hull built at the Yard. Complete details on DSRV will be printed in the next issue.

Tours

A program for culturally deprived children, the first of its kind in the United States, is now underway in this area. Called "Keys to Learning," 45 members of the pilot group—seventh graders from Evans Elementary School in Yeadon—toured Sun Ship on Tuesday, July 12. The youngsters visited the Fabrication, Boiler, Sheet Metal, and Pipe shops, and the shipbuilding ways, with a visit to the #3 dry dock providing the final highlight of the morning.

Accompanied by William Hollywood and Thomas Donnell, instructors for the program, the children were given a lecture on buoyancy and displacement as they visited the various areas.

The 45 youngsters on the tour are among the first members in the "Keys to Learning" program, a concept sponsored by the federal and state governments for children from preschool age through eighth grade whose families have incomes less than \$3000/year. Meeting four mornings a week at the Yeadon school, part of the activities involve visits to selected industrial sites, such as the one to Sun Ship. These visits coincide with classroom instruction in science and social studies. Children with all phases of their environment so as to achieve more effective school learning and more active citizenship.



One of several tours through the yard. These children are members of the "Keys To Learning" Project.

Another group of children, the Americans for the Competitive Enterprise System (ACES), visited Sun Ship on Wednesday, July 20. Numbering around 30, this group is part of the Delaware County Vocational School. It has a similar purpose in broadening young boys and girls concerning the opportunities and advantages existing in the Delaware County community.

Job Seekers Tour

On Saturday, August 6, from 10 a.m. to 4 p.m., 118 prospective applicants for positions as welders, pipe fitters, draftsmen, and other skills responded to advertisements carried in the Philadelphia Inquirer, Evening Bulletin, and Delaware County Times to tour Sun Ship and the "S.S. Santa Cruz."

Of the 118 persons who accepted the invitation, 34 signed applications and are currently being interviewed. The "S.S. Santa Cruz," the largest, fastest vessel serving inter-American trade routes between this country and South America, recently completed sea trials and was delivered to Grace Line.

Besides showing prospective employees how far shipbuilding has advanced, the tour further served to impress area workers with the many activities existing within the Yard. For instance, Sun Ship is among the few firms in the country in on the ground floor of an oceanology.

Besides stimulating interest among skilled workers in Philadelphia, Delaware, Montgomery, and Bucks Counties as well as in Delaware and Southern New Jersey, the ad reached prospective employees as far south as Maryland and as far north as Ontario, Canada.

Sun Ship has increased its work force from 4400 employees in February to slightly over 4800. With the new programs underway, the company expects to add 800 workers before the end of the year to keep abreast of expansion. By filling these positions, Sun Ship hopes to compete even more aggressively with shipbuilders in the southeast and along the east and west coasts.

WELDING STUDIES UNDERWAY

Currently underway at Sun Ship is a one-year study program on fabrication processes for large 18% nickel maraging steel structures. Awarded to the Rocket Fabrication Division on June 1, 1966 by NASA-LEWIS Research Center, the work under this contract includes local aging processes; additional welding procedures; development; effect of porosity on weld toughness; and related tasks. Most of the 18 percent nickel maraging steel material for these studies is already in stock at the Rocket Shop. Over 55 test plates will be welded and studied for this contract, which is worth approximately \$150,000.

A research and development project that it resulted from the successes by the Rocket Fabrication Division in welding maraging steel rocket cases, nozzle liners, and nozzle throat pressure hull assemblies. This newly-awarded contract is considered quite desirable for the Yard as it will enable Sun Ship to maintain the creative position as the foremost fabricator of maraging steel. Additionally, this program will coincide with the nozzle shell and entrance ring fabrication program for the Aerojet General. For that program, one of the post fired nozzle shells being modified to a submergence type will require local heat treatment of the nozzle position as the nozzle. The effects of such a heat treatment will be covered under the NASA contract to Sun Ship.

SMASHING SUCCESS—Assisted by Paul Albin, President of Sun Ship, Mrs. W. R. Grace christens "S.S. Santa Elena." Story, Page 4.

Apprenticeships Offered

In a new approach, employment opportunities at Sun Ship were further advertised when, during the end of the spring semester, members of the personnel department addressed various high school senior classes in the Delaware County area regarding opportunities available for senior graduates at Sun Ship's registered and well-established apprenticeship program. Through the efforts of Charles Long, Jack Harrington, and Jack Sostone, over 200 seniors were contacted, many of whom later visited the yard, toured the facilities, and applied for apprenticeships.

Preliminary Steps

Before an apprenticeship is awarded, an applicant is first screened by the Personnel Department to determine interest, ability, and other standards. Those who qualify are then referred to the Pennsylvania State Employment Service for specific trade aptitude testing. When the results of these tests are available, those meeting Sun Ship's apprenticeship requirements are invited back for an interview to discuss the test results and to meet with the department foreman in their particular area of aptitude.

As a result of these pre-employment tests and interviews, 23 of the seniors were hired as apprentices in the following departments: machinists, boilermakers, sheetmetal, electricians, pipefitters, outside machinists, shipfitters, and drafting. Four others from within the shipyard also qualified, and were transferred to the program.

Apprenticeship Agreement

The first six months of the four-year apprenticeship are probationary. However, all apprentices are required to apply themselves with the best of their ability to all tasks, obey all Company rules, and endeavor to conduct themselves at all times in a creditable manner. Much time, money and effort is expended in affording an apprentice the opportunity to become a skilled journeyman.

In addition to practical training in the yard, each apprentice is required to spend a minimum of 44 hours each year at related trade subjects during each year of the apprenticeship. The subject matter is predetermined by the particular trade involved and as stated in the Apprenticeship Agreement.

Upon successful completion of apprenticeship training, Sun Ship recommends to the Pennsylvania Apprenticeship Council that a "Certificate of Apprenticeship" be awarded to the graduating apprentice.

Minimum wages paid apprentices start at 50 percent of the base rate in the respective department. The wage scale is graduated over eight equal periods so that at the completion of the program, the pay rate is equivalent to that of a first-class mechanic.

Openings generally become available every six months, and inquiries should be addressed to the apprentice supervisor, Jack Harrington, 184-106 Sun Ship's Training Director.

IN MEMORIAM

Sun Ship expresses deepest sympathy to the families and friends of the following deceased employees.

No.	Name	Age
90-2	Frank Burr	78
54-8	Daniel Dougherty	77
75-36	Angelo Gabrielle	80
75-72	William Freedy	80
58-	Charles Green	69
63-59	William Haffley	66
67-91	Hilbert Holmes	46
58-201	Clarence Johnson	59
81-34	John McCormick	84
9-13	John Mullen	65
47-834	Edward Murphy	39
67-133	Edward Neal	52
93-56	Jose Rico	70
70-	James Sawa	71
33-28	John Stotwinski	38
8-38	William Stewart	69
66-	Alfred Underhill	60
66-58	Gosse Wahl	80
74-293	Gussie Young	70
58-106	Peter Zacary	73

*Retired

Fab Shots of Viet Nam Barges



A "travagance" in 47 shop was used to burn out the bismarck diffuser. As the electric fireproofing follows the template, the bright burning beads (background) zip-zap down the plate, cutting the nested pieces.



The deck subassembly was constructed upside down and includes the longitudinal and transverse bulkheads. Ten such subassemblies were constructed; the deck subassembly was then turned over and placed on the already constructed bottom shell assembly.



After being moved from plates, the stiffener "blanks" was taken to the Boiler Shop where they were form pressed. Special end cuts were then required before their installation into the various subassemblies.



Welder puts finishing touches on one of the four spud caps. After the pipe spud is driven through the spud well of the pier section into the bottom sand, the cap is fitted into the top and the lifting gear attached so that the unit pulls itself up out of the water.

Popularity Rises

Due to the increased inclusion of container operations, Hull No. 642, 643, and 644 for United States Lines will now be constructed as full container ships. This design change will result in each ship having a capacity for 622 standard 20 foot containers.

These are the last three of five United States Line cargo ships now under construction at Sun Ship.

Delivery has been rescheduled to the first, second, and third quarters of 1968 from an original schedule of late '67-early '68.

The popularity of containers spurred United States Lines to convert to container operations. The two large holds served by the 70-ton booms on the previous flight built at Sun Ship, the "S.S. American Rear" and her sister ships.

Face Changes

The face-lifting operations quietly underway throughout the shipyard in the past months have now included the razing of #4 shipway. In-process through July and early August, a portion of #4 shipway on the north side was dismantled. This included the towers, the crane runway, and two cranes. One of the two cranes from this way (the large overhead crane) was subsequently sold while the other has been reinstalled on #3 shipway, replacing a crane on that shipway which was also sold.

Originally used for ship construction, #4 shipway has been obsolete for some time due to the size of ships now being built in this yard. Sun Ship Hull 592 was the last ship built on #4 way. A tanker named the "S.S. Hillyer Brown," the keel was laid on July 1, 1953, launched August 12 of the following year and delivered to her owner, Standard Oil of California, on December 6, 1953.

Moorings Cells

At the same time, Sun Ship has applied for a construction permit from the Corps of Army Engineers to build two mooring cells offshore from #4 and 5 piers. Similar to the mooring cells constructed for #3 dry dock, these concrete cells will be 30 feet in diameter. They will enable #4 and #5 piers to accommodate ships up to 1,000 feet long.

As they exist now, #4 and 5 piers are capable of mooring ships up to only 500 feet in length. Extending the piers the additional length needed is not only more costly, but the moors are so designed that they can be used for supporting a pier if, in the future, a need arises for a floating pier.

Since the mooring cells will extend offshore into the river, Sun Ship must await a decision on the effects of the proposed construction on navigation in the Delaware before the permit can be granted. So far, no objections have been raised against its issuance.

The cells constitute one of the many improvements being made to Sun Ship's capability.

Crew Readied

The second Grace Line Crew Training Program concluded at Sun Ship on July 15, 1966 when the 12 attendees from Grace Line, Inc. and one member from the Maritime Administration each received his "Certificate of Accomplishment." The 12 members representing Grace Line are the crew of the "Santa Cruz," Sun Ship Hull 634, which was delivered to her owners on August 23 and sailed from the yard on August 23.

The course, which opened on June 13 with an introductory address from Grace Line's Captain Short and Sun Ship's Jack Harrington, was designed to familiarize the crew with the centralized control concept of these highly automated ships. As with the class for the "Santa Lucia," both Sun Ship employees and representatives from major suppliers participated as instructors.

The administration of the school was taken over to 40-1 Department. Vic Pajon replaced Bill Cook as training coordinator, due to the demands of new contracts being awarded to the Rocket Fabrication Division.



Harry Carter, 3rd Assistant Engineer on Grace Line's "Santa Cruz," accepts his "Certificate of Accomplishment" from Sun Ship's Vic Pajon. Behind Mr. Pajon is Charles De Luca, Senior Port Engineer. De Luca delivered the closing address. Jack Harrington, at far right, spoke in behalf of the yard.

LAUNCHING

Sun Ship Hull 636 became the "S.S. Santa Elena" at 5 p.m. on July 6, 1966. With a blessing from Rt. Rev. Monsignor George L. Smith, and christened by Mrs. W. R. Grace assisted by her maid of honor, Miss Alison Grace Byers, the ship slid into the Delaware. The fourth of six modern automated cargo vessels, the keel of the "Santa Elena" was laid May 11, 1965.

To accommodate the launch, #3 dry dock was detached from its upstream mooring cell and pivoted about the downstream cell until it extended out into the river 90° from its normal location. Normally, this dry dock is moored across the ends of the two longest building ways. Tugs restrained the dry dock while the launch was in process.

RETIRES

Recently retired after accumulating distinguished service records are the following employees.

Name	Badge Number	Years of Service
John D. Blair, Jr.	79-6	47
Harry Becton	36-27	27
William Draper	76-114	39
Henry Jones	81-87	36
Henry Lester	67-76	38
George Lynn	76-87	20
Arthur Martin	88-2	32
Augustine McClay	14-67	40
Jesse McDaniel	60-46	31
Gosse Petchel	79-64	48
Robert VanHom	45-11	41

*Author of article on guarantee engineers, page 2.



CRUSHED SKULL Not for Edward Thompson, 34-86, whose solving the heat that which saved him from a serious head injury. Ed, a pipefitter's helper, was helping to install piping on the tank top when a metal object dropped from about 30 feet above, striking him on the hat. There is no question that his hat saved him from an extremely severe injury.

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