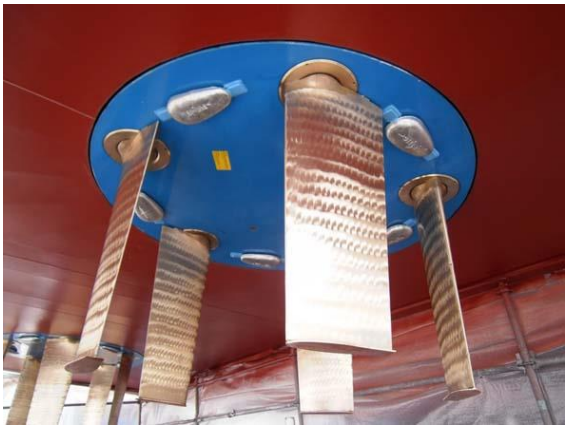
Ocean Construction Platform SEACON Development

Working at sea doing construction operations required the need for a large stable platform to support all the project material, construction equipment and personnel and that could be positioned above the construction site reliably. In 1972, that ship did not exist in the Navy inventory. Ocean construction projects in the early 1970's had to be done from whatever seagoing Navy craft that was available. This added a lot of risk to the success of a project and to the personnel involved. The Naval Facilities Engineering Command (NAVFAC) agreed with the need to design, develop and acquire an Ocean Construction Platform and the design and construction began in 1974 for SEACON and the platform was delivered in 1976.

To conserve the cost for building SEACON, we acquired an available hull used to transport the Saturn rockets from their test facility in MS to Cape Canaveral. This hull was 260 feet long with a breath of 48 feet. It was perfect for what our needs were and that hull was incorporated into the design for SEACON. The construction platform had 6,240 square feet of open deck space for operations, a centerwell of 13 feet by 20 feet allowing construction operations to be conducted through the center of the ship if necessary, and 1050 horsepower for propulsion and positioning.



Voight-Schneider Propellers

Most ships use dual propulsion plants driving dual propellers to move the ship for efficient seagoing transit operations. However, dual propellers do not allow for reliable positioning control. The propulsion plant for SEACON was designed for the most efficient positioning control. SEACON propulsion plant had three Voight-Schneider propulsion engines, with two located aft and one forward. The Voight-Schneider engine is installed through the hull with a rotating circular steel plate through which are five helicopter-like blades pointing downward perpendicular to the rotating steel plate. The helicopter-like blades are then rotated to create a force in anyone of 360 degrees of direction. Thus, the three motors can force the ship to move in any direction desired including in transit. The three motors were coupled together through a navigation system and, using a joystick, you could move the ship in any direction you wish to go including moving sideways if needed. The ship could also be rotated in a circle if necessary. This was the first ship ever built with Voight-Schneider engines in the US. These engines were mostly used for tug propulsion in Europe. The propulsion system allowed us to hold the construction platform in place within a radius of less than 50 feet under heavy sea state conditions. Under a calm sea state conditions, we could maintain position within a few feet.

The SEACON is the Navy's first ocean construction platform. Converted from a 260-ft (79.2 m) YFNB-5603 seagoing barge, the SEACON was designed to be a self-sufficient, dynamically

positioned platform. Specialized navigation, control and under water systems permit the vessel to locate, recover, and install structures on the ocean bottom. Additional capabilities include: laying and shore-ending cable, diving operations, and deep ocean lifts of 50 tons. Designed for versatility, the large deck space and center well are intended to support various specialized equipments utilized during each particular operation. This paper discusses the design requirements and criteria for the conversion, method of construction, general arrangement, and propulsion machinery. The dynamic positioning control, navigation and underwater systems are described. The vessel's first major operation is discussed along with comments on its design and performance.

SEACON could accommodate up to 50 operational and ships personnel for periods of up to 2 months at sea. SEACON operated in the Atlantic and Pacific Oceans for twenty years performing ocean construction operations before it was decommissioned.

The Navy's first and only platform specifically designed for offshore construction has been acquired by the Chesapeake Division of the Naval Facilities Engineering Command (CHESNAVFACENGCOM) as part of its offshore construction equipment inventory. Designated the SEACON (an acronym for "sea construction"), the selfpropelled vessel is a converted YFNB barge hull previously used by the National Aeronautics and Space Administration to carry Saturn rocket components.

The vessel is 260 feet long, has a 48-foot beam, and displaces 2,300 tons when loaded.

SEACON's 6,240 square feet of open deck area aft is designed to withstand heavy loading, and configured to accommodate roll-on/roll-off construction equipment as well as permanent deck machinery. She has a 13 by 20-foot centerwell for minimum motion overboarding operations, and a 50-ton gantry crane will soon be installed to complete the outfitting. The vessel can be easily rigged for a wide variety of offshore construction tasks such as cable-laying, diving support, or handling heavy loads.

Although SEACON has a propulsion capability, it is towed to construction sites by a Navy tug. Once on site, the platform's surface and subsurface navigation systems provide inputs to a dynamic positioning control system, and thrust requirements are transmitted to the propulsion units. Both positioning and local transit power is provided by three (one forward—two aft) cycloidal propulsion units capable of producing 1,050 horsepower. This system allows SEACON to maintain fixed position for precise placement and recovery of ocean structures and underwater instrumentation in conditions up to sea state four.

SEACON is jointly manned by Navy military and civilian personnel and is designed to be placed in an unmanned caretaker status when not deployed. The platform has accommodations for 50 persons and an endurance of approximately four weeks.

Conversion of the barge was done at Norfolk Shipbuilding and Drydock Corporation's Berkley Plant under the cognizance of the supervisor of shipbuilding in Portsmouth, Va„ and CHESNAVFACENGCOM.

The vessel was accepted in July of 1976 and immediately deployed to the Virgin Islands, where she was used to support the repair and expansion of the underwater test range at the Atlantic Fleet Weapons Training Facility. This project was the largest offshore repair effort ever undertaken by the Navy, and its successful completion was directly related to the outstanding performance and characteristics of the SEACON.