

Project Name: Seafloor Construction Experiment, SEACON II

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Organizations/People Involved:

CEL: Ted Kretchmer, Gene Edgerton, Norm Albertson, LT Tony Parisi, LT Gary Sniffin, LT Rich MacDougal

Date: 1974-1976

Project Summary:

SEACON II was a major undersea construction experiment whose primary goal was the measurement of a complex, three-dimensional cable structure's steady-state response to ocean currents, and the use of these measurements to validate analytical design models. A secondary goal was to provide a demonstration and critical evaluation of recent developments in ocean engineering technology required to site, design, implant, and operate, fixed subsea cable structures. The SEACON II structure consisted of a delta-shaped module tethered by three mooring legs in 2,900 feet of water. The top of the structure was positioned approximately 500 feet below the surface. The mooring legs were 4,080 feet long, with each arm of the delta 1,000 feet long. Experimental explosive anchors embedded two of the legs, while a 12,500-pound clump anchor containing a radioisotope thermoelectric generator held the third leg. The entire structure was heavily instrumented in order to collect current profile data and position data. These data were used to validate the computer program DESADE.

The Navy Seafloor Construction Experiment (SEACON) program supported the Navy's requirement for the development and evaluation of technology for constructing undersea installations. It was part of the Deep Ocean Technology (DOT) Project sponsored by NAVFAC. SEACON II was the second in a series of major undersea construction experiments managed by the Navy's Civil Engineering Laboratory (CEL).

The SEACON II structure was designed and built to satisfy this need for data on the steady-state response of a complex cable structure to ocean currents. The structure size and depth were selected to provide a challenging implant exercise and to allow reliable extrapolation of the validation data to the size of structures that might be designed for the deepest locations in the ocean. An instrumentation system was designed to meet the structure's predicted response and the level of validation desired.

The structure was built, installed and maintained in the ocean from August 1974 to May 1976. During the implant period, current profiles and corresponding structure responses were measured. The structure was then recovered to permit visual examination of its condition and to perform tests on its components.

Site investigation began in 1972 starting with establishing the criteria including water depth, currents, proximity to Port Hueneme, avoidance of shipping lanes, sea state and bottom conditions. Five potential sites were selected and preliminary surveys, consisting of bottom core sampling, salinity, temperature and dissolved oxygen profiling, and subbottom profiling were conducted. The site in the Santa Monica Basin, 27 miles from Port Hueneme, was chosen. Virtually no data were found in the literature on the two most important parameters – currents and sediment properties and that required a one-year effort to accumulate sufficient data to make a final site selection decision.

Installation of the SEACON II structure was divided into eight separate phases, each of which was designed to be accomplished in one day or less. The CEL warping tug and converted LCM-8 diving boat were the primary installation vessels, with CEL civilian personnel and divers doing the work. The installation was completed in September 1974.

Shortly after the structure was installed, testing revealed failures in three of five tension cells and the three acoustic projectors. Over the next year, repair efforts involved recovery/replacement of some equipment and underwater splicing of cables by divers. SUBSEVGRU 1's manned submersibles, Turtle and Seaciff, were used along with the Naval Undersea Center's CURV III vehicle were also used.

In May 1976, after nearly 22 months in the water, the SEACON II structure, consisting of nearly 30 tons of hardware, was recovered aboard the CEL warping tug with the LCM-8 and CEL divers assisting.

Project Report Link: *Seafloor Construction Experiment, SEACON II (ADA 040278)*

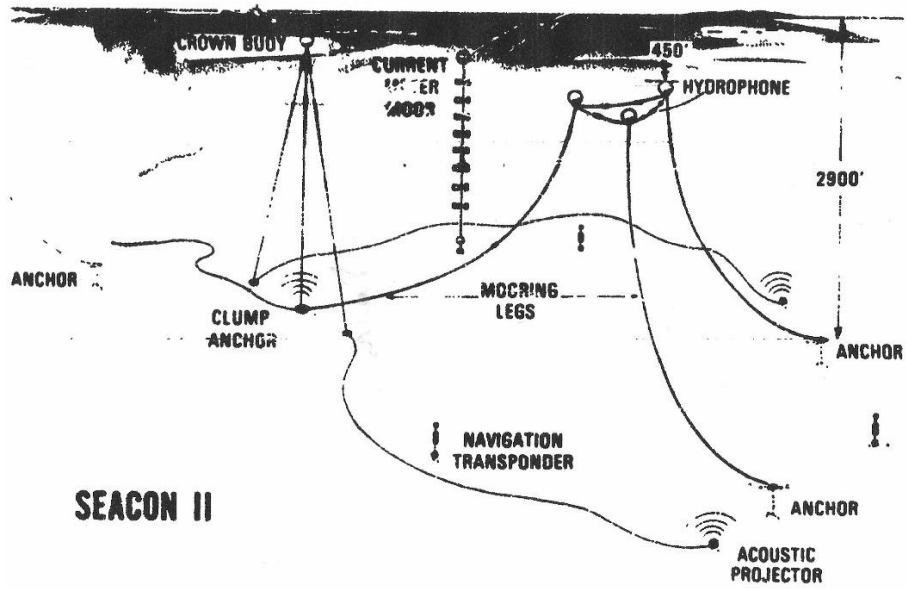


Figure 1-1. Artist's view of implanted SEACON II structure.

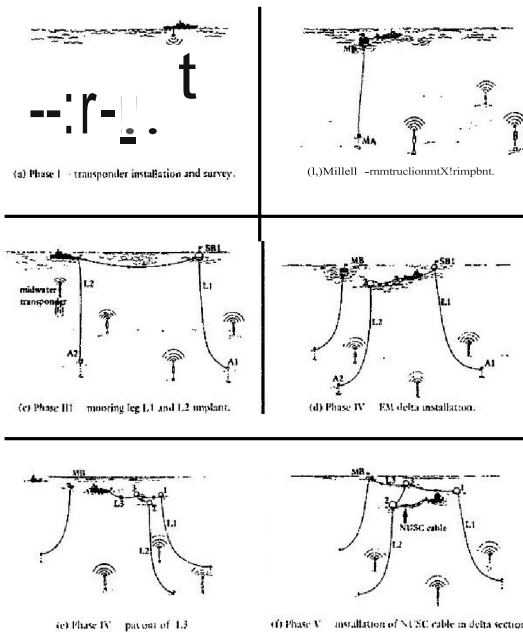


Figure 4-2. SACS II installation sequence - Phases I through V.

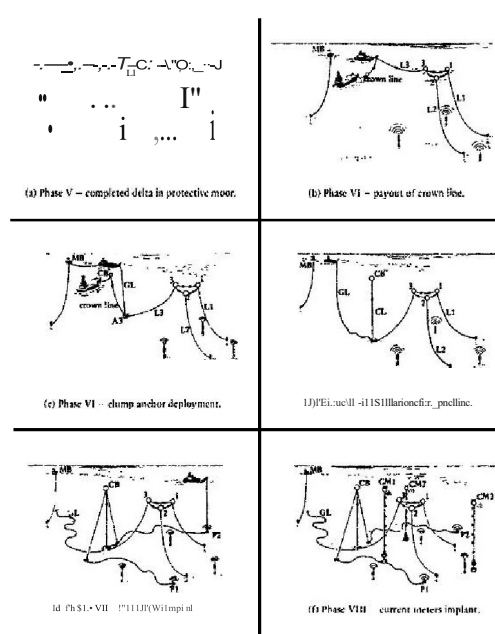


Figure 4-3. SACS II installation sequence - Phases V through VIII.