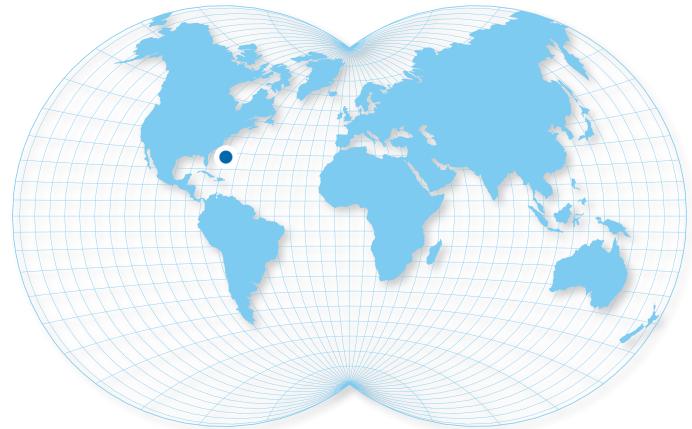


WORLDWIDE, NORTH AMERICA: RA-DE SALM® – Unit #1



Scope of Work

This unique Rapid Deployment SALM (RA-DE SALM®) was developed based on SOFEc commercially available SPM technology. The system was designed, constructed, deployed, recovered, tow tested and sea-trialed to prove its capability for support of expeditionary strike forces.

This design required the determination of forces and motions resulting from waves and currents and was configured for installation with equipment and U.S. Navy trained personnel. In-house computer software correlated with an empirical data bank of wave basin model tests provided the ability to analyze the SALM. Seafloor soil interaction with the base structure was analyzed to provide a gravity-base structure with the required holding power. The base was designed to be towable at speeds over 10 knots and constructed with dual buoyancy tanks at the bow and stern capable of withstanding full submergence in 60m of water depth.

An important design criterion for the RA-DE SALM® was to be rapidly deployed and fully recoverable. Knowledge of marine construction, application of marine equipment, utilization of construction divers and ability to predict water column stability during deployment and retrieval were key to successful system design.

SOFEc designed hydraulic lift and launch beams for loading the RA-DE SALM® abroad the USS Potomac.

The launch beams for loading/unloading and transporting the 1,000-ton RA-DE SALM® onboard the tanker were a heavy lift "shipboard offloading system". Development of the concept and the detailed design required expert knowledge of naval architecture, prediction of ship / barge response to ballasting, heavy structures and mechanical components, hydraulics, marine construction and seamanship.

General Description

Client Name:	Naval Sea Systems Command (NAVSEA)
Contract Award:	September 1984
Installation Date:	August 1985
Application:	Fuel Import

RA-DE SALM® - Unit #1

(Continued)

Project Specifications

Water Depth:	11 - 61m [35 - 200ft]
Tanker Size:	70,000 dwt
Dimension - Buoy:	4.7mØ x 9.1m
Swivel:	Piggable, dual-product, 740 psig operating
Floating Hose:	2 x 6-in.
Flowline Hose:	2 x 6-in. Flexible reeled submarine pipeline 8 Reels each with 914m (3,000ft) totalling 7,310m (23,890ft)
Hawser System:	12-in. Single grommet
Anchor Leg System:	Single anchor leg chain, 3.5-in. Stud link ORQ adjustable length with chain swivel
Anchor System:	Gravity base 16.5m x 43.6m

Comments

The systems were designed to be quickly adjustable to the site-specific water depths by altering the make-up of the single anchor leg chain assembly. The gravity base and the penetration of its shear keys into the seafloor provided anchoring to the seafloor. No heavy lift equipment is required to deploy or re-deploy the systems.