US Army Corps of Engineers®
Engineer Research and Development Center

CORE-LOC™ Concrete Armoring

Technology

CORE-LOC is an innovative coastal protection armor unit designed to withstand the harshest of wave climates. Its unique design as a strong interlocking unit eliminates a slender central section, the weak point in many other concrete armor units which have had a tendency to break at that point. In contrast, CORE-LOC's strength is in the center of the unit. Its superior hydraulic stability is attributed to the extraordinary interlocking of its symmetrically tapered octagonal members. This product is the result of years of concrete armor research at the U.S. Army Engineer Research and Development Center (ERDC).

Problem

The need for reliable navigation and shore protection structures to withstand high wave energy has been a timeless worldwide concern. Research efforts at ERDC's Coastal and Hydraulics Laboratory (CHL) date back to the 1950s. Dramatic improvements occurred through the years. Dolos, which had previously been the most popular armor unit used by the U.S. Army Corps of Engineers, had some inherent design flaws, especially a tendency to break in the center. This brought about a need to both repair dolos slopes and to find a design for a stand-alone armor unit to be used on breakwaters.

Expected Cost To Implement

Costs vary throughout the world due to the fluctuating prices within the global market for supplies and labor.

Benefits/Savings

CORE-LOC has become the concrete unit of choice for both new construction and repair of existing concrete-armored slopes because of its extraordinary efficiency. Advantages are that it dissipates the maximum amount of wave energy with the least amount of concrete, requiring significantly less materials; its layer has a reserve stability which will continue to function if the design event is exceeded which is not the case with more slender units such as the dolos or the tribar; it can also be placed in a single layer, unlike most other types of concrete armor units which are placed in two layers. Keeping in mind that the cost of an armor layer is proportional to the total volume of concrete on the slope, CORE-LOC has one of the lowest packing densities in the industry, which brings about significant reduction in on-slope concrete volume. Together these factors account for an economic advantage of approximately 50 percent cost-savings over the costs associated with other concrete armor units.

Status

CORE-LOC armor layers have been designed for over 75 structures and 20 have been constructed so far. At the first CORE-LOC project in Port St. Francis, South Africa, 800 15-ton CORE-LOC units have provided exceptional protection for a breakwater and peninsula for 5 years. This site endured three design level storms during breakwater construction. Patents and trademarks for CORE-LOC have been filed in more than

30 countries. The technology has been regionally licensed worldwide to several firms. (See "Distribution Sources.")

ERDC POC

Jeffrey A. Melby, CEERD-HC-PS, e-mail, jeffrey.a.melby@erdc.usace.army.mil
Phone: 601-634-2062

Distribution Sources

Jim Anderson, Concrete Technology Corporation (CTC), 1123 Port of Tacoma Road, Tacoma WA, 98421, P.O. Box 2259, Tacoma, WA 98401, Phone: 253-383-3545, e-mail: janderson@concretetech.com

Michel Denechere, Core-Loc International (CLI), 3 cour du 56, av. Marcel Dassault, 37200 Tours, France, Phone: 33 0 2 47 74 18 10

Gordon K. Prestedge, Prestedge, Retief, Dresner, Wijnberg, Marina Centre, West Quay Road, Victoria and Alfred Waterfront, Cape Town, South Africa, P.O. Box 50023, Waterfront 8002, Phone: 021 418-3830, e-mail: gprestedge@prdw.co.za

Minoru Hanzawa, Environmental Division, Shinjuku-I-land Wing, 6-3-1, Nishi-shinjuku, Shinjuku-ku, Tokyo 160-8350, Japan, Phone: 81-3-3342-0156, e-mail: hanzawa@tetra.co.ip