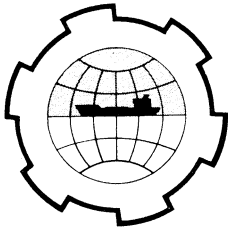


PORT AND OCEAN ENGINEERING UNDER ARCTIC CONDITIONS  
TECHNICAL UNIVERSITY OF NORWAY



CONCRETE ARMOR UNITS FOR COASTAL STRUCTURES

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Coastal structures subjected to large breaking waves require the use of specially designed concrete shapes to maintain the integrity of the structure. Stones large enough to function properly are generally not available when the design wave exceeds about 9 meters (30 feet). In other cases of smaller attacking waves, concrete shapes may be competitive with natural stone from a cost standpoint.

The designer is faced with many decisions along the path to selection of an armor unit, its detailed shape and necessary size. Collectively the units must be capable of maintaining the structures integrity when resisting the brunt of the sea by dissipating the storm wave's energy. Singly, or in harmony with adjacent units, the shapes must have the strength to remain intact and the mass to resist damaging movement.

Experience has been gained in many countries with armor units of varying shapes. Design has been guided by use of physical models and by analysis of prototype installations. Formalized guidance to U.S. designers of coastal structures is being prepared by a special ad hoc committee of the U.S. Army Corps of Engineers using existing world-wide experience with concrete armor units. Considerations include selection armor units (stone vs. concrete), types of units available and their characteristics, hydraulics of armor units (coefficients), structural design of individual armor units (dimensions and reinforcing), specific weight of concrete (light and heavy weight), design of cross section (shape, extent of cover and number of layers), need for model studies and construction problems (forming, stripping, transporting and placing.)

This paper is presented to stimulate discussion of concrete armor units for coastal structures in the hope that the decision making process required for design of those units will be simplified and optimized.

