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Engineer Research and Development Center

Monitoring of Pocket Wave Absorbers in Parallel, Vertical-Wall Jettied Entrance Channels

Description

Parallel jetties at dozens of harbor entrances in the Great Lakes were constructed of rock-filled timber crib structures, many in operation for over 100 years. Many of the structures have been rehabilitated by encasing them in steel sheet pile. The wave climate between the jetties appears to increase significantly, due to the reflective surfaces, causing navigational difficulties and damage to moored vessels. To mitigate for the more energetic wave climate, the U.S. Army Engineer District, Detroit, has removed small sections of steel sheet piling at selected harbor entrances and replaced them with pocket wave absorbers. A pocket wave absorber is created when a section of sheet pile wall is removed, or recessed from the remainder of the jetty, and stone is placed in the area to provide a rough, porous sloping surface to increase dissipation of wave energy. The typical length of a pocket is 200 to 300 ft. The wave absorbers have been installed as a single pocket, and in pairs, on opposite sides of the channel.

View of pocket wave absorbers located at Pentwater Harbor Entrance, Michigan

Issue

As part of the Monitoring Completed Navigation Projects (MCNP) program of the Headquarters, U.S. Corps of Engineers, pocket wave absorbers at Pentwater Harbor, Michigan, are being monitored to determine their effectiveness in reducing wave heights in the entrance channel. At Pentwater Harbor entrance, a pair of pockets has been installed on opposite sides of the channel.

Supporting Technology

Prototype wave gauges were installed along the channel side, and additionally incident wave conditions were measured lakeward of the entrance. Data obtained will be used to validate physical model experiments. A physical model of Pentwater Harbor entrance was constructed to study pocket wave absorber design parameters, and a wide range of incident wave conditions (wave heights, periods, and directions). The MCNP program has a designated web page located on the CHL website.

Benefits

Design parameters such as pocket location, pocket length, structure slope, and stone size was studied to develop design guidance relative to pocket wave absorber parameters.

Sponsors

U.S. Army Engineer District, Detroit and Engineer Research and Development Center, Coastal and Hydraulics Laboratory.

Point of Contact

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Additional information can be found at *http://chl.erdc.usace.army.mil*.