



# Fact Sheet

US Army Corps of Engineers  
U.S. Army Engineer Research and Development Center

January 2003

Public Affairs Office □ 3909 Halls Ferry Road □ Vicksburg, MS 39180-6199 □ (601) 634-2504 □ <http://www.wes.army.mil>

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

**Purpose:** To determine the effectiveness of pocket wave absorbers in reducing wave heights in entrance channels where they are utilized in conjunction with parallel steel sheet-pile jetty configurations.

**Background:** 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.

**Facts:** As part of the Monitoring Completed Navigation Projects 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. Prototype wave gauges will be installed along the channel side of the jetties both lakeward and shoreward of the absorbers. In addition, incident wave conditions will be measured lakeward of the entrance. Wave periods and heights in the channel will be correlated with incident wave and wind directions. Data obtained will be used to validate physical model experiments. A physical model of Pentwater Harbor entrance will be constructed and unidirectional spectral waves reproduced to study pocket wave absorber design parameters. Upon validation with prototype data, the model will be used to study a wide range of incident wave conditions (wave heights, periods, and directions). Design parameters such as pocket location, pocket length, structure slope, and stone size will be studied to develop design guidance relative to pocket wave absorber parameters. Currently, little to no design guidance is available for predicting the effectiveness and optimizing the design of the many feasible variations of pocket wave absorbers.

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