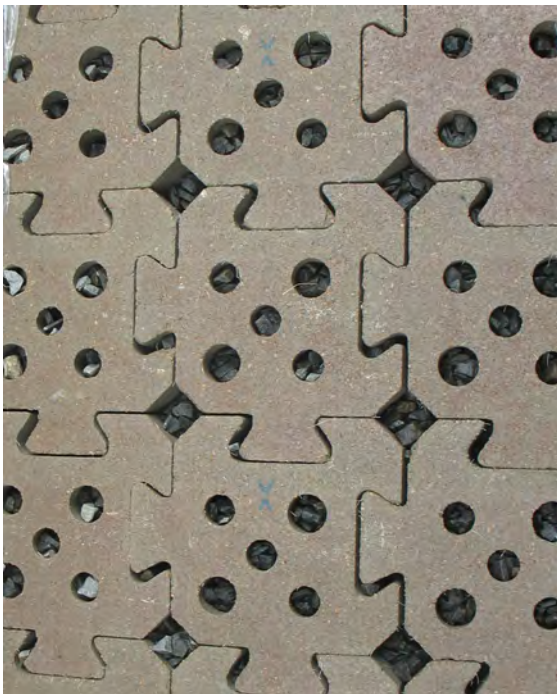


# FINAL REPORT

## HYDRAULIC STABILITY OF CHANNEL LOCK II CLASS 450 CONCRETE BLOCK SYSTEM IN STEEP-SLOPE, HIGH VELOCITY FLOW

2H:1V Slope, No Drainage Layer



Prepared for:  
Erosion Prevention Products  
P.O. Box 891586  
Houston, TX 77289-1586  
August 2009

**AYRES**  
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# 1. INTRODUCTION

## 1.1 General

This report documents a series of full-scale tests to determine the hydraulic stability of an articulating concrete block (ACB) revetment system produced by Erosion Prevention Products. Ayres Associates was contracted by Erosion Prevention Products to conduct a hydraulic study program involving the installation and testing of a 4.5-inch thick articulating concrete block revetment system known as the Channel Lock II Class 450 system.

The testing program described in this report was conducted during June 2009 at Colorado State University's (CSU) Engineering Research Center in Fort Collins, Colorado. The testing program was conducted in CSU's Steep Slope Flume on a 4-foot wide, 23-foot long test section of compacted soil, 12 inches thick, at a slope of 1V:2H (50%) in the direction of flow.

The Channel Lock II block is a precast open cell concrete block system. Each block in the system has 5 open cells that can be filled with rock, or with topsoil for vegetation. Physical characteristics of the blocks are discussed in detail in Section 2.2.

The system included a nonwoven needle-punched geotextile (Mirafi® 180N) installed directly on the soil. The revetment system was placed by hand on top of the geotextile according to procedures outlined by Erosion Prevention Products. No drainage layer was used beneath the block system. No cables were used in the installation.

Personnel from the CSU hydraulics laboratory constructed the earthen test section, installed the block system, conducted the test runs, and performed all data collection. Ayres Associates personnel observed installation of the testing system, all phases of the testing program, conducted the hydraulic analysis and interpretation of test data, and developed this report.

The preparation and construction of the earth test section and installation of the revetment product followed the techniques outlined in ASTM standard D-7277, *"Standard Test Method for Performance Testing of Articulating Concrete Block (ACB) Revetment Systems for Hydraulic Stability in Open Channel Flow."* The hydraulic tests, including data collection techniques and reporting, followed the protocols established by ASTM standard D-7277.

Hydraulic analysis included regression techniques and direct-step computation as recommended in ASTM standard D-7276, *"Standard Guide for Analysis and Interpretation of Test Data for Articulating Concrete Block (ACB) Revetment Systems in Open Channel Flow"*. These procedures were used to determine the Manning's n value and associated hydraulic conditions using measured water surface elevations and total discharge for each test.

Key personnel involved in the study included:

**Erosion Prevention Products:**

Mr. Lee Smith

**Ayres Associates:**

Mr. Paul E. Clopper, P.E.  
Ms. Laura Girard

**Colorado State University:**

Dr. Chris Thornton, P.E.  
Ms. Amanda Cox  
Mr. Michael D. Turner

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