Title: Field Implementation of Polyacrylamide within Treatment Systems

Polyacrylamide (PAM) is often used as a part of a treatment train for the treatment of stormwater to reduce its turbidity. This study investigated the application of PAM within various treatment systems for a construction site environment. The general concept is to introduce hydraulic principles when placing PAM blocks within an open channel in order to yield high mixing energies leading to high turbidity removal efficiency. The first part of the study observed energy dissipation using a hydraulic flume for three dissimilar configurations. The flume was ultimately used to determine which configuration would be most beneficial when transposed into field-scale conditions. Three different configurations were tested in the flume, namely, the Jump configuration, Dispersion configuration and the Staggered configuration.

The field-scale testing served as both justification of the findings within the controlled hydraulic flume and comprehension of the elements introduced within the field when attempting to reduce the turbidity of stormwater. As a result, the Dispersion configuration proved to be the most effective when removing turbidity and displayed a greater energy used for mixing within the open channel. Consequently, models are developed based on calculations from the results of this study to better serve the sediment control industry when implementing PAM blocks within a treatment system.

Recommendations are made for modification and future applications of the research conducted. This innovative approach has great potential for expansion and future applications. Continued research on this topic can expand on key elements such as solubility of the PAM, toxicity of the configuration within the field, and additional configurations that may yield more advantageous energy throughout the open channel.

Major: Civil Engineering/General

Educational Career:
Bachelor's of Civil Engineering, BS, 2009, University of Central Florida

Committee in Charge:
Dr. Manoj Chopra, Chair, Civil, Environmental and Construction Engineering
Dr. Marty Wanielista, Civil, Environmental and Construction Engineering
Dr. Alain Kassab, Mechanical, Materials and Aerospace Engineering

Approved for distribution by Dr. Manoj Chopra, Committee Chair, on June 21, 2011.

The public is welcome to attend.