MarTREC UTC Project Information Form
USDOT Tier 1 University Transportation Center
Agency ID or Contract Number DTRT13-G-UTC50

Project Title: Exploration of Novel Multifunctional Open Graded Friction Courses (MOGFC) for In-situ Highway Runoff Treatment
Project Abstract (Brief Description): This study is aimed at exploring a new material for in-situ treatment of highway storm water runoffs to prevent pollution of water bodies. Storm water runoffs from highways contain both organic and inorganic contaminants of which large portions are eventually conveyed to the nearby water bodies such as rivers and lakes. The U.S. Departments of Transportation (DOT) are subjected to increasing pressures from water quality regulatory agencies for the control and treatment of highway storm water runoffs. There is an urgent need to alleviate the effects of highway runoffs. Copper and zinc have been identified to be the major inorganic contaminants in highway runoffs. The goal of this study is to explore a Multifunctional Open Graded Frictional Courses (MOGFC) by adding innovative additives to Open Graded Friction Courses (OGFC) to create a new material that has high heavy metal removal capacities. A series of batch experiments will be conducted to optimize the material composition and fabrication process and to determine its adsorption capacities for heavy metal removals. Technical guidance for highway application of this material for effective management of highway storm water runoffs will be produced.
Describe Implementation of Research Outcomes (or why not implemented) After testing ten different additives on their absorptions of Cu and Zn, two types of additives, i.e., Granular Bentonite produced by Texas Sodium Bentonite and Sodium Bentonite by Charles B. Chrystal Co., were identified to be the most effective in absorbing Cu and Zn. Permeability, air voids, and compressive strength of the samples were tested. The absorptions of the samples on Cu and Zn were also tested using batch absorption test and dynamic absorption test. It was found that these additives do not improve the physical properties of the PCP samples, neither the absorption abilities on Cu and Zn.
Impacts/Benefits of Implementation (actual, not anticipated) The results of this study bring an important conclusion that not only can the pervious concrete pavement bring the traffic-related benefits, but also environmental benefits because its long-term removal capacities for Cu and Zn, which are the major heavy metal contaminants in roadway runoffs. The use of PCP in roadways and parking lots brings positive impacts for the sake of environmental protection.
Web Links: http://www.jsums.edu/imtrans/
Budget (Funding) Amounts & Source(s) (US DOT +Match(s) =Total Costs): MarTREC $48,102 + JSU $24,056 = total cost of $72,158
Project Start and End Dates: July 1, 2014 – June 30, 2015. A no cost extension granted until June 30, 2016. Project Complete.
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