

Improved Characterization Techniques for Beneficial Use of Slag Materials



Recycled
Materials
Resource
Center



Federal Highway Administration

Project Principal Investigator
Jeffrey S. Melton, Ph.D.
Dept. of Civil Engineering
University of New Hampshire
Gregg Hall, 35 Colovos Road
Durham, NH 03824
Tel: (603) 862-2107
Fax: (603) 862-3957
Email: jeffrey.melton@unh.edu

RMRC
Gregg Hall, 35 Colovos Road
Durham, NH 03824
Tel: (603) 862-4704
Fax: (603) 862-3957
<http://www.rmrc.unh.edu>

Project Objectives

To evaluate new U.S. and European leaching protocols that are supposed to be simplified and less expensive.

Project Description

Slag is a byproduct of industrial processes such as iron and steel production, and large quantities of slag are generated wherever these industries are located. Ground granulated blast furnace slag is now widely used in concrete, but other slag and slag-like materials are lagging in terms of beneficial use. Many states currently allow the use of slag in construction applications, but not all the states have specific guidelines to regulate quality control. This can lead to environmental issues involving leaching of hazardous contaminants and subsequent costly cleanup. This was the case at the Hopkins International Airport in Cleveland when sulfur compounds leached from a runway constructed with steel slag and contaminated a nearby creek. Incidents like this are not only costly, they increase barriers to the appropriate widespread beneficial use of slag. At this time, slag producers are often forced to decide between stockpiling their slag indefinitely and spending money on costly characterization tests. Most people would agree that the beneficial use of this material is important for removing unsightly stockpiles, saving landfill space, and reducing the dependence on natural aggregate; the question is how to proceed.

In 1998-1999, the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) conducted a beneficial use survey to determine the issues that states face when using a variety of secondary materials. The data from the 40 States that completed the survey was presented in an April 2000 report. The report identified the greatest barrier as the

lack of good information to use when evaluating the risks to human health and the environment. This project will evaluate new U.S. and European leaching protocols that are supposed to be simplified and less expensive. These protocols measure the leaching behavior of a granular material as a function of pH and liquid-to-solid ratio so that the results can be applied to a number of different beneficial use scenarios. In this project, steel mill fines, blast furnace



Graduate student Sandy Weymouth loads samples of steel slag into a Gas Adsorption Analyzer used to determine surface area.

slag, basic oxygen furnace slag, and submerged arc welding slag materials are being tested using the new protocols as well as standard TCLP and SPLP tests.

The results will be compared and evaluated to

determine if the new protocols will make it easier and cheaper for slag producers, state DOTs and state EPAs to show that a given material is appropriate for a given beneficial use application. Ultimately, the protocols will be tested against a variety of different materials, not just slags, to evaluate the potential for widespread use of these protocols.

Project Partners

SMC, Inc., Lincoln Electric, Inc., Ohio Department of Transportation

End Products

This project will provide leaching data on several under-utilized slag and slag-like materials. A number of simplified leaching protocols will be evaluated and compared to TCLP and SPLP results. Guidance about the different protocols will be developed.

Further Information

The Recycled Materials Resource Center (RMRC), a cooperative agreement between the University of New Hampshire and the Federal Highway Administration, is a national center that promotes the appropriate use of recycled materials in the highway environment. Its focus is on the long-term performance and environmental implications of using recycled materials.

For detailed quarterly progress reports for Project 10, as well as all RMRC-funded research projects, please see: <http://www.rmrc.unh.edu/Research/researchlevel2.asp>.