

QUARTERLY PROGRESS REPORT

March 1, 2016 to May 31, 2016

PROJECT TITLE: Use of Solid Waste in Asphalt and Concrete in Florida.

PRINCIPAL INVESTIGATOR(S): Timothy G. Townsend

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CO-PRINCIPAL INVESTIGATOR(S): Chris Ferraro

AFFILIATION: Research Assistant Professor, University of Florida
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COMPLETION DATE: August 31, 2016

PHONE NUMBER: 352-392-0846

PROJECT WEB SITE: <http://pages.ees.ufl.edu/townsend/research/hc15/>

Work accomplished during this reporting period:

Municipal Solid Waste Incineration Bottom Ash

An environmental characterization was performed on two municipal solid waste incineration (MSWI) bottom ashes collected in the previous quarter. Batch leaching tests performed on fresh and aged bottom ashes included the TCLP, SPLP, and EPA LEAF methods (leaching as a function of pH, and leaching as a function of liquid-to-solid ratio). Select constituents of potential concern (COPC) in regard to leaching to groundwater were determined with this methodology. Total metal concentrations of fresh bottom ash were quantified using EPA Method 3050B to identify any elements posing a risk to human health through direct exposure.

A series of Proctor Compaction tests was conducted on two fresh MSWI bottom ash sources to assess ash reuse potential as a graded road base material. The optimum moisture content and corresponding maximum dry density achieved under compaction was determined for each in accordance with ASTM D1557. Compacted specimens from the Proctor test were evaluated for Limerock Bearing Ratio (LBR) according to Florida Method 5-515. LBR results were compared to minimum requirements listed in FDOT Road and Bridge Specification Section 204 for graded aggregate base materials.

Work planned for the next reporting period:

Perform particle size screening of stockpiled solid waste incineration bottom ashes in effort to create a more effective beneficial reuse aggregate.

Create laboratory cylindrical specimens of Portland cement concrete (PCC) containing MSWI bottom ash. The bottom ash will be introduced as a coarse aggregate replacement in laboratory mix designs at various replacement percentages. These bottom ash-containing specimens will be tested for strength and durability using standardized ASTM methods (e.g. compressive strength, surface resistivity, etc.)

Metrics:*Graduate Students*

Name	Rank	Department	Professor	Institution
Justin Roessler	PhD student	Environmental Engineering	Timothy Townsend	University of Florida
Linda Monroy Sarmiento	PhD student	Environmental Engineering	Timothy Townsend	University of Florida
Michael Hofmeister	Master's student	Environmental Engineering	Timothy Townsend	University of Florida
Matthew Schafer	Master's student	Environmental Engineering	Timothy Townsend	University of Florida
Stephen Townsend	Master's student	Environmental Engineering	Timothy Townsend	University of Florida

Undergraduate Students

Name	Rank	Department	Professor	Institution
Ryan Hundersmark	Undergraduate Research Assistant	Environmental Engineering	Timothy Townsend	University of Florida
Kyle Clavier	Undergraduate Research Assistant	Environmental Engineering	Timothy Townsend	University of Florida

TAG Meeting:

On April 27th a Technical Awareness Group (TAG) meeting was held at FDOT State Materials Office. The theme of the meeting was the reuse of solid waste materials as construction materials. Several graduate students made presentations on the use of solid waste materials in various applications (e.g. solid waste incineration ash as component in Portland cement concrete, hot mix asphalt, and cement kiln feed). Presentations ranged from describing the mechanical properties of the solid waste as potential aggregates, to the environmental considerations and leaching test protocols necessary for proper risk assessment.

Invited TAG members include:

- John Schert, Hinkley Center
- Tim Vinson, Hinkley Center
- Nawaf Blaisi, University of Florida
- Jerry Paris, University of Florida
- Cory Dilmore, FDEP
- David Dee, Law Office of David A. Dee
- Dawn Templin, FDEP
- Ramana Kari, Waste Management Inc.
- Ray Schauer, Solid Waste Authority of Palm Beach County
- Kim Byer, Hillsborough County Solid Waste Division Director for Public Works
- Justin Gostnell, Seminole Electric Cooperative
- Mike Petrovich, Hopping Green & Sams
- Jason Gorrie, JMG Engineering
- John Power, Attorney
- Craig Browne, Geosyntec Consultants
- Steve Laux, Jones Edmunds
- Joel Woolsey, Jones Edmunds
- Tobin McKnight, Jones Edmunds