Bi-Monthly Progress Report:

Project Number and Title: URI Project 3.6 Recycling Infrastructure Assets and Reduction of Transportation System Greenhouse Gas Emissions Research Area: Thrust 3 New Systems for Longevity and Constructability PI: K. Natacha Thomas, University of Rhode Island (URI), Civil and Environmental Engineering
Co-PI(s): K. Wayne Lee, URI, University of Rhode Island (URI), Civil and Environmental Engineering
Reporting Period: April – May 2019
Date: 8/26/2019

Overview:
Provide overview and summary of activities performed during previous two months….

Last two months were spent deciding on a framework to select tools, software and database, to conduct the study LCA/LCCA analyses. With regards to framework, the study focused on isolating a limited number of studies that may yield valuable information on how to select appropriate LCA tools and how to best tackle LCA analyses for pavement structures. Further, the choice of LCA tools entails a balance, if not a compromise, between cost and efficiency. Tools already owned by the university would naturally be free. Those not owned would cost if not in the public domain. (The university at present owns licenses for Umberto LCA+.) Hence, the framework further narrowed on categorizing LCA tools as owned by the university or otherwise within the public or private domains and then comparing their efficiencies at solving pavement structures LCA/LCCA analyses.

Core papers identified include Dovetail Partners Inc., 2017 and AzariJafari, H et al., 2015. The first study leaned on three (3) databases from public sources, US Life Cycle Inventory Database, CPM LCA Database, and the European Life Cycle Database, along with three private LCA tools, ecoinvent 3.0, GaBi, and SimaPro. Dovetail Partners Inc., 2017, provides a sound basis on which to compare datasets and LCAs for study purposes, albeit not necessarily for pavement structures. The study does point out a wealth of criteria including credibility of information, ease of searching for data, understandability of datasets, and available breadth of processes by which to compare tools. The study further details the particular means of gauging each criterion. Since ISO 14040, 2006, provides a comprehensive standard for LCA conduct, Dovetail Partners Inc., 2017, weigh heavily the compatibility with the ISO standard as comparison criterion. The second study outlines the research challenges and opportunities for pavement LCA studies by mainly pinpointing areas of neglect by current studies.

Thus, within the last two months, framework, criteria, and means of comparison of various LCA tools were documented.

Provide context as to how these activities are helping achieve the overarching goal of the project …

The study aims to achieve durable, cost effective and environmental system with reclaimed asphalt pavement (RAP) in hot mix asphalt (HMA), warm mix asphalt (WMA) and/or cold mix asphalt (CMA). Conducted task is genuine to the review of best practice as well as to the conduct of baseline and proposed pavement structures LCA analyses.

Describe any accomplishments achieved under the project goals …

Using criteria stated in Dovetail Partners Inc., 2017, and avoiding the process pitfalls outlined by AzariJafari, H et al., 2015, the study will shortly narrow down on the actual tools to utilize for LCCA analyses conduct. The availability of Umberto LCA+ for free at URI will also be weighed. The reliability and the validity of actual LCA tools utilized in carrying the study will determine the study's ability to meet project goals.

Describe any opportunities for training/professional development that have been provided…

The undergraduate student working on the project will be senior in the Civil Engineering BS program. Per his participation in this project, the student is highly motivated to enter the MS program still in Civil Engineering. All these achievements will go toward enhancing the labor pool of the northeastern region of the US.

Describe any activities involving the dissemination of research results (be sure to include workshops, seminars, and conferences attended/held for dissemination of information regarding this project) …

None applicable

Participants and Collaborators:

What organizations have been involved as partners on this project?

None

Have other collaborators or contacts been involved? If so, who and how?

Name of Technical Champion: Dr. Wilfred Hernandez, P.E.
Title: Safety Specialist/EDC Coordinator
Organization: FHWA – RI Division
Phone number: 401-528-4033
Email: Wilfred.hernandez@dot.gov

What students have participated in the project? (Include class standing, major, role in the research)

Stephan Zaets, CVE Junior, initiated modeling of life cycle cost analysis

Changes:

None

Discuss any actual or anticipated problems or delays and actions or plans to resolve them…

None

Discuss and changes in approach and the reasons for the change…

None

Planned Activities:

Description of future activities over the coming months.

Conduct the study LCA/LCCA analyses. With regards to framework, the study focused on isolating a limited number of studies that may yield valuable information on how to select appropriate LCA tools and how-to best tackle LCA analyses for pavement structures. Further, the choice of LCA tools entails a balance, if not a compromise, between cost and efficiency. Tools already owned by the university would naturally be free. Those not owned would cost if not in the public domain. (The university at present owns licenses for Umberto LCA+.)