Project Title:
Assessing Sustainability Effect of Infrastructure Transportation Projects Using Systems-Based Analytic Framework

Principal Investigators:
PI: Dr. Islam El-adaway, Mississippi State University
Co-PI: Dr. Dennis Truax, Mississippi State University

Start Date:
July 2013

Completion Date:
December 2014

NCITEC Funds:
$70,944

Matching Funds:
$71,403

Category:
Administration and Management; Planning and Forecasting; Policy; Research; and Society.

Project Description:
It is essential to build, maintain, and use our intermodal transportation in a sustainable manner that meets our current needs while addressing the social and economic needs of future generations. To this end, Greenroads and, GreenLITES, and INVEST have been developed as transportation sustainability rating systems, respectively. However, these valuable systems focus mainly on the environmental and technical elements of sustainability and do not incorporate fully the broader economic, socio-cultural, and individual sustainability indicators.

This *intellectual merit* of this project is to fill in the gap within the available transportation sustainability rating systems models that are set-off from actual social data and lack the broad human-built environmental system components. This project will develop three novel benchmarks to holistically analyze infrastructure transportation projects. The "work benchmark" will study the social/cultural and individual sustainability; the "nature benchmark" will examine the technical, environmental and economical sustainability; and the "flow benchmark" will measure the overall system change. These three forms will be applied to various projects. When successful, this new systems framework will create awareness of sustainability in transportation multiple interrelated contexts through comprehensive life-cycle analysis. In other words, this project will determine spatial interdependencies, interactions, and measurements of the different sustainability indicators to verify which factors and characteristics are interrelated for new, reconstruction, or rehabilitation infrastructure transportation projects.

The *broader impact* of this proposed project is to develop a scalable and transferable model of research, instructional integration, and assessment. First, this project will develop an innovative transportation rating system that can be used both nationally and internationally which will give significantly improve intermodal transportation system planning, design, performance, and evaluation. This will also bring national recognition to NCITEC being the house for such innovative system. Second, this project will integrate systems thinking for sustainable transportation in the existing undergraduate and graduate green building systems coursework at Mississippi State University. Finally, this project will support publishing multivariate peer-reviewed academic papers at the top journals and conferences published by the American Society of Civil Engineers.