Grant Deliverables and Reporting Requirements for UTC Grants

UTC Project Information	
Project Title	Development and Evaluation of Porous Pavement Surface Mixtures with Biobased Epoxy Asphalt Binder
University	University of South Florida
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Funding Source(s) and Amounts Provided (by each agency or organization)	USDOT: $57,543 University of South Florida: $28,851
Total Project Cost	$86,394
Agency ID or Contract Number	Sponsor Source: Federal Government CFDA #: 20.701 Agreement ID: 69A3551747119
Start and End Dates	Start date: 10/01/2018 End date: 09/30/2019
Brief Description of Research Project	Porous asphalt mixture, designed with a large interconnected air void system, can be placed on pavement to reduce hydroplaning-related traffic accidents, mitigate heat-island effect, and reduce traffic noise. However, due to its thermoplastic and high porosity nature, the material generally has low durability in the field. This research project aimed to improve the durability, strength, and sustainability of porous asphalt mixture by formulating bio-based epoxy asphalt binder (BEAB) and improving its mixture design. In the study, a BEAB formula was firstly developed through a uniform experimental design. Then, the performance of porous asphalt mixture containing BEAB was tested and evaluated along with traditional porous asphalt mixture. Finally, a simple ranking approach was introduced to improve the current mixture design approach. Based on laboratory test results and analysis, the optimum BEAB formula was identified as 7% epoxidized soybean oil (ESBO), 5% maleic anhydride (MA), and 88% base asphalt (PG 67-22). In practice, to achieve balanced pavement performance for water permeability, mixture durability, strength, and cracking resistance, a 4.75-mm nominal maximum aggregate size (NMAS) open gradation with an optimum BEAB content is recommended. The developed

	BEAB-based porous asphalt mixture may promote the applications of porous asphalt pavement (“green pavement”) and open-graded friction course (OGFC) in more community health related scenarios.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	The research outcomes, in terms of the formula of bio-based epoxy asphalt binder with epoxidized soybean oil and the recommended mixture design with small aggregate size gradation, may be implemented by transportation agencies in asphalt mixture design and pavement construction. Field validation with test sections, however, is necessary before they actually move into the application phase. The research outcomes were introduced to graduate students at the PIs’ institute for potential follow-up research work, and will be disseminated through paper publication in journals and presentation at professional conferences and meetings with municipal and state transportation agencies.
Impacts/Benefits of Implementation (actual, not anticipated)	Impacts of future dissemination of research outcomes are yet to be determined.
Web Links • Reports • Project website	http://ctech.cee.cornell.edu/final-project-reports/