

ATTACHMENT 5: UTC PROJECT INFORMATION SHEET

UTC Project Information – Project #	
Project Title	Enhancing the Durability of Bridge Decks by Incorporating Microencapsulated Phase Change Materials (PCMs) in Concrete
University	University of Rhode Island
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Funding Source(s) and Amounts Provided (by each agency or organization)	TIDC Request: \$175,000 URI In-kind cost share: \$155,427 URI VPR In-cash cost match: \$20,000
Total Project Cost	\$350,427
Agency ID or Contract Number	
Start and End Dates	01/01/22 – 12/31/23
Brief Description of Research Project	In Rhode Island and other New England states, combined effects of freeze-thaw-induced damage and chloride ingress (from deicing salts) make it very challenging to maintain the quality of concrete on bridges and road surfaces. This project will develop, evaluate, and assess the feasibility of incorporating microencapsulated phase change materials (PCMs) into the concrete to reduce freeze-thaw/chloride ingress-induced degradation. Under freezing ambient conditions, when PCMs freeze, they release a large amount of heat that helps keep the deck/pavement warmer. As a result, PCMs can reduce the number of freeze-thaw cycles in bridge decks which can lead to a significant reduction in damage/ingress of salt and an increase in life expectancy. In this project, a series of comprehensive experiments will be performed to evaluate the influence of PCM-incorporated concrete overlays on the freeze-thaw damage response and durability of concrete against chloride ingress. Moreover, the experimental results will be synergistically integrated with a robust performance prediction tool to enable efficient design of PCM concrete overlays specifically targeted for winter weather conditions in Rhode Island and other northeastern states.