ACCELERATED BRIDGE CONSTRUCTION
UNIVERSITY TRANSPORTATION CENTER

UTC Project Information	
Project Title	Advanced Corrosion Detection Combining Chemical Odor and Magnetic Flux Measurements
University	Florida International University
Principal Investigator	Kenneth Furton
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Funding Source(s) and Amounts Provided (by each agency or organization)	ABC-UTC funds: $70,000
Total Project Cost	$70,000
Agency ID or Contract Number	69A3551747121
Start and End Dates	May 30,2023 – May 30,2024
Brief Description of Research Project	This research project aims to address the issue of structural deficiencies in bridges caused by corrosion by utilizing odor analysis and canine detection methods. By studying the volatile organic compounds (VOCs) generated during metal corrosion, the project seeks to train canines to detect and differentiate between corroded and non-corroded materials. This approach, combined with the non-destructive Magnetic Flux Leakage Method (MFL) and AI/ML optimization, will enable accurate detection and localization of significant corrosion sources, contributing to improved bridge inspection and maintenance practices.

The project's preliminary work involves demonstrating the canines' ability to detect chemical odorants and differentiate corroded and non-corroded samples. The proposed research will involve collecting VOC odors from corroded test specimens, analyzing them using sorption disks and gas chromatography techniques, and training canines to detect and distinguish the odors. The accuracy of canine detection will be compared to MFL measurements, and AI/ML algorithms will be employed to optimize the combined detection methods. Ultimately, this research will provide valuable insights and practical tools for enhancing bridge inspection and corrosion detection processes. |

Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	The outcomes will be tracked and reported once they are identified.
Impacts/Benefits of Implementation (actual, not anticipated)	The impacts will be tracked and reported once they are identified.
Web Links • Reports • Project website	[Advanced Corrosion Detection Combining Chemical Odor and Magnetic Flux Measurements | Accelerated Bridge Construction (fiu.edu)](#)