



UNIVERSITY TRANSPORTATION CENTER RESEARCH BRIEF

PROJECT TITLE: Improving Safety on Highway Work-zones by Real-time Tracking of Operation and Equipment Status

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INSTITUTION: SINGLE-INSTITUTION PROJECT

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Background

The uniqueness of performing construction stems from certain inherent structural qualities such that those necessarily involving the production of one-off products that are usually spread over wide areas, and typically involving a complex collaboration between multiple

disparate and heterogeneous resources. Such operations require dedicated personnel for planning and monitoring them, and current technological solutions stemming from the recently emerging ubiquity of wireless sensors and telematics fall short of providing actionable insight in real-time. Another undesired consequence of the complexity of construction operations is the dismal safety record of the industry.

The PIs recognize that while sensors provide real-time data, this data is unusable as it relates to a very specific part of the larger operation. This necessitates further processing after synthesis with other sensor data before any actionable information is obtained. This processing step necessarily prevents the information from being obtained in real-time, i.e. when the data is generated by the sensors. Herein lies the problem for which the PIs strive to provide a solution – the development of a means to process raw sensor information from construction equipment and worksites in realtime at the source of the data to communicate actionable insight to project managers and decision-makers. The PIs are interested in exploring avenues whereby such insight could improve the safety and / or productivity of operations.

Research Project

The need for monitoring progress coupled with the

linear spread of highway work zones exacerbates already dangerous work zones by necessitating travel around them by supervisors. While monitoring operations is a necessary aspect of highway operations, it is extraneous to the actual performance of the construction/ maintenance work. This research project investigates the possibility of providing site supervisors and decision-makers with a means of monitoring the operation remotely through the provision of a real-time overview of operational status.

This goal will be accomplished by providing a methodology that converts raw data from an equipment's controller area network bus (CANBUS) into its work status, which can then be communicated to the site supervisor. This processing is planned to be accomplished by using a microcontroller with wireless communication capabilities that is equipped with the means of reading data directly from an equipment's CANBUS. The scope of this research project will be to investigate whether an equipment's CANBUS data can indeed be used as a predictor of its operational status. It is anticipated that this research will improve the overall safety of highway work zones by providing operation monitoring remotely, thereby extraneous travel and by enabling a connected site that can check for dangerous conditions automatically.

