Research in Progress

Automated Guardrail Inventory and Condition Evaluation

Research Need

MassDOT actively works with FHWA on MASH implementation. It is critical to plan and manage MASH upgrades and integrate the guardrail asset within its asset management plan with a complete guardrail inventory.

Goals/Objectives

This proposed study is aimed at developing and validating new processes using automated methods to identify and extract locations of in-service guardrail and evaluate condition and compliance using pilot-testing road sections. The detailed objectives include: 1) Developing an automated method for determining the presence of guardrails along the roadway and for extracting critical information, including georeferenced starting and ending points, terminal types, curb presence, lateral offset and elevation; and 2) Developing an automated method for identifying typical conditional changes for guardrails, including face dent, end terminal damage/missing, guardrail support deficiency. The research team will also investigate the feasibility of identifying missing bolt or connection failure of guardrails using image processing. The anticipated deliverables include a complete, georeferenced or linear referenced guardrail inventory for the selected pilot-testing sections, integrating the in-service presence and condition information.

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Project Information

This project is being conducted as part of the Massachusetts Department of Transportation (MassDOT) Research Program with funding from Federal Highway Administration (FHWA) State Planning and Research (SPR) funds.

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Performing Organization:
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Project Champion:
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Project Start Date:
January 18, 2021

Expected Project Completion Date:
January 31, 2022

Methodology

The research team will develop LiDAR and image processing algorithms to identify the locations, extract the properties and the conditions of guardrails along the ten selected pilot-testing sections. The research team will also investigate the feasibility of identifying missing bolt and connection failure of guardrails using image processing. If proved feasible through the validation of the representative pilot-testing roads automated methods leveraging mobile LiDAR and imagery will become a cost-effective and efficient means for populating guardrail information for the complete network. The implementation of the automated processes from this research will provide MassDOT a powerful tool to both address the pressing need for MASH compliance and to support the routine guardrail maintenance program.

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