

Assessing and Monitoring Performance on Small Culverts

STUDY TIMELINE

10/2023 – 9/2025

INVESTIGATORS

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More information about the Agency of Transportation Research Program, including additional Fact Sheets, can be found at:
<http://vtrans.vermont.gov/planning/research>

Introduction

Culverts are critical infrastructure for managing stormwater runoff and flood control. VTrans requires inspecting all culverts every 5 years, about 9,600 small culverts per year. Many of these culverts have small diameters that preclude human inspection. Culvert failures can be expensive and lead to flash flooding and unseen subsurface damage. Improved methods of monitoring and assessing the conditions of culverts, enables timely maintenance and planning of replacement projects.



HIVE 2.1 Culvert inspection robot built with low-cost components and with simple design that allows for easy fabrication and maintenance

Project Methodology

This project builds on previous VTrans sponsored research into building small culvert inspection robots, i.e. HIVE 1.0 and 2.0. The methodology is to design, build and test new robots that are cheaper, easier to build and maintain, yet more capable than previous variants. This includes working closely with VTrans personnel to evaluate and improve the new designs, then deliver two robots for field testing and usage.

Conclusions/Next Steps

Major findings are an improved HIVE 2.1 culvert inspection robot has been built and successfully completed preliminary performance tests.

Impacts and Benefits

The benefit is an improved scalable method of inspecting small culverts, leading to better use of culvert maintenance resources that reduces flooding and expensive repairs.