Develop efficiencies and versatilities for roadway drainage maintenance
SJN 135775

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Background

ODOT maintains approximately 43,000 lane miles of roadside ditches creating significant constraints on budgets and labor. Money spent on ditch cleaning/maintenance directly affects the long-term cost of all roadway maintenance by slowing deterioration, reducing the scope for future repairs and protecting the investment made in roads against premature loss. The aim of the proposed research is to develop a more versatile and efficient process of cleaning/maintaining roadside ditches by increasing safety, optimizing labor hours, increasing flexibility of ditching process, and minimizing damage to road surfaces.

Research Context

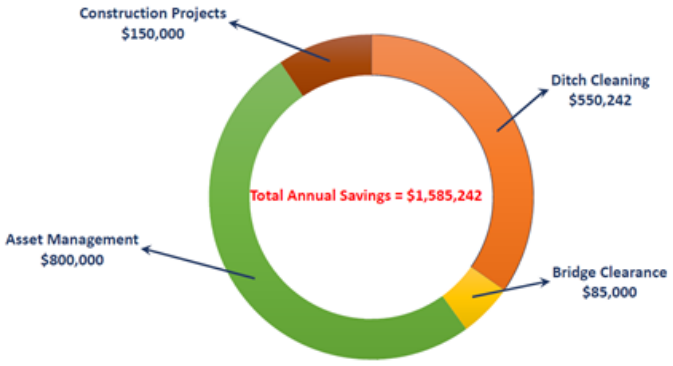
The goal of phase 1 of the project was to evaluate ODOT's current roadside ditching process. Another goal was to evaluate the use of Mobile LiDAR system (MLS) as a tool to map ditches by measuring roadway surface geometry from right-of-way line to right-of-way-line at the network level. Mapping ditches using LiDAR will enable ODOT to determine whether roadside ditches are doing their job properly and safely and identify roadside ditches that have drainage issues so that timely corrective maintenance can be performed.

Research Findings

When compared to conventional methods, a wheeled excavator reduces the cost of maintaining ditches by more than 25%. In addition, the versatility of the wheeled excavator allows its use in setting up culverts, tearing up pavement, sidewalks and curb and gutter, removing trees downed by storms as well as moving concrete barriers. Furthermore, wheeled excavators can travel across finished concrete and asphalt without leaving marks or tearing up the surface. That gives wheeled excavators more access to paved roadways where most of ODOT maintenance activities occur.

Use of MLS in planning and assuring quality of ditch cleaning, asset management, measuring bridge clearances and construction surveying could potentially save ODOT more than $1.5M annually and have a payback period of 1 year.

Although owning and operating a survey grade MLS is a big investment and although the workflows currently used for processing MLS data rely sometimes on custom algorithms, the research concluded that the benefits of using an MLS far outweigh the initial ownership and recurring operational costs.



The research team recommends that in Phase 2 of the project, an ODOT crew be trained on using a wheeled excavator and that productivity studies be conducted to determine the production rate of the proposed wheeled excavator under different project conditions. The research team also recommends that in Phase 2 of the project, an ODOT LiDAR team comprised of 3 people be formed and trained on MLS data collection and processing and that the research team at the University of Cincinnati (UC) and Texas A&M Transportation Institute (TTI) provide support to the ODOT LiDAR team for developing expertise in data collection, data processing, and developing custom algorithms.

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