Automatic Tools for Quick and Accurate Construction Cost Estimation for Retaining Walls

Problem Description

As noted in AASHTO (2013), the inability to accurately estimate project costs can result in poor financial decisions. Estimated costs that are too high result in a reduced calculated benefit-to-cost ratio that may lead to rejecting a project that should be accepted. Estimated costs that are too high can also incorrectly indicate an overrun in TDOT budgets that can contribute to fewer projects being developed and constructed. On the other hand, costs that are too low result in a high benefit-to-cost ratio that may lead to accepting a project that should not be accepted and can contribute to underrun TDOT budgets whereby the non-expended funds could have been used to develop and construct more projects.

Research Objectives

The primary objective of the research is to develop software modules providing tools to quickly and better estimate the construction costs of retaining walls. The estimating modules will:

- Consider construction processes and activities, including estimated productivity and unit price information reflected in costs;
- Allow TDOT professionals to adjust the estimate based on different site conditions and relevant factors, such as wall heights, wall lengths, preferred wall types, required ground improvements (for global stability), and moment slabs or other required fixtures;
- Integrate the automated toolset and emerging technologies to help streamline the estimation process of retaining wall construction;
- Consider the bid environment when estimating costs, including the time of year, number of bidders, project location, and current economic conditions; and
- Establish standard pay items and their implementation for estimate and bid consistency.

Potential Implementation and Expected Benefits

The implementation of this research will result in TDOT's ability to produce more accurate estimates of retaining walls as part of the Plans, Specifications & Estimate (PS&E) project phase to effectively evaluate construction bids and minimize the risk of change orders to the awarded construction contract during construction. User's manuals will be developed for software cost estimating modules and facilitate the implementation of the software in the current TDOT construction cost estimation process because it will provide a resource to current and future TDOT personnel for the use of the software as well as provide a resource for updating the software with current cost data.

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