

## Evaluation of subsurface utility engineering for highway projects: Benefit–cost analysis

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DOI: 10.1016/j.tust.2011.08.002

Tunnelling and Underground Space Technology, Volume 27, Issue 1, Pages 111-122 (January 2012)

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### Abstract

Accurate location of buried utility infrastructures is a vital issue for utility owners, utility managers and engineers, designers, and contractors that perform new installations, repairs, and maintenance on highway projects. Unreliable information on underground utilities can result in undesirable consequences such as property damage, claims, and other social and environmental problems. Subsurface utility engineering (SUE) is becoming a significant method for reducing the potential for underground utility conflicts at the project planning phase. SUE accurately identifies, characterizes, and maps underground utilities through four quality levels. This study presents a SUE benefit–cost analysis (BCA) to encourage a better understanding of SUE and the use of SUE. Eleven main benefit factors and two cost factors are identified and estimated on twenty-two SUE projects and eight non-SUE projects from Pennsylvania Department of Transportation (PennDOT) districts. In addition, this study reveals the relationship between benefit–cost ratio and complexity levels of buried utilities.

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### Highlights

► This study presents a benefit–cost analysis on 22 SUE and 8 non-SUE projects. ► 11 main benefit factors and 2 cost factors are identified and estimated for analysis. ► The results reveal that \$11.39 can be saved for every \$1 spent on SUE. ► A ratio of 1.65% is determined as the ratio of SUE cost to total project cost. ► This means that SUE can provide accurate utility information with reasonable cost.