

## DEVELOPMENT OF AN AUTOMATION NEED INDEX FOR A CONSTRUCTION PROCESS

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This research endeavor is focused on the development of a systems approach for identifying potential tasks of automation within a construction process. A two step system analysis for automation is described in detail as it applies to drilled shaft foundation construction. The first step of the analysis includes data collection and productivity analysis to justify automation of the proposed process. More than 100 hours of field data were collected through site observations. A Time Lapse Videocassette (TLV) recorder was utilized in order to quantify the productivity ratings of the process. If the productivity of the process is lower than the desired level, then a feasibility analysis is performed. The second step includes taxonomy development and automation need assessment to identify tasks to be automated. A taxonomy that includes 8 tasks, 36 subtasks, and 150 activities was developed from the collected data. Through the Time-Benefit-Technology (TBT) method, an Automation Need Index(ANI) is computed to quantify the automation potential of each task in the process. The TBT method is composed of three factors: the time portion factor, the benefit level factor, and the technology availability factor. Surveys were conducted and statistically evaluated to determine the feasibility of selected tasks. This study concluded that, from the original list of 36 subtasks, three tasks had the greatest need to be automated. These were 'Excavating (ANI: 8.0),' 'Inspection (ANI: 5.5),' and 'Slurry (ANI: 5.4)' tasks.