

Analyzing Demolition Operations

The reusability and recyclability of demolition waste are significantly affected by demolition operations, for instance, the specific motions that excavators and other pieces of equipment use when lifting and moving debris. These motions are largely driven by productivity considerations. As such, investigating the productivity of demolition operations is key to understanding the decision-making processes affecting the recyclability and reusability of demolition waste. Traditional approaches for tracking the duration of demolition operations can be costly and time consuming. To enable more effective and efficient productivity monitoring, this project collects and uses linear and angular acceleration data from inertial measurement unit sensors attached to articulated members of different machines during small-scale demolition simulations and develop an activity identification model using a machine learning classification algorithm. In particular, CEE undergraduate students have been engaged in operating small-scale excavators for performing different demolition tasks while generating the motion data during their operations for further analyses. Through this hands-on experience, the students will also enhance the understanding of their roles as civil engineers for sustainable demolition management. Furthermore, the structural laboratory of the Department generates a great deal of structural waste after experiments for teaching and research. This project will use those materials for research purposes, thereby diverting the waste from landfill sites and contributing to institutional sustainability.

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