



Departmental Seminar
Department of Civil Engineering and Engineering Mechanics
Columbia University

Real-time Pro-Active Construction Resource Location Tracking

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253 ENG TER (2nd Fl)



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Every work day five construction workers die in the United States – a rate that is three times higher than the average of any other industry. Safe and efficient design and monitoring of site activities in increasingly complex, large, and capital intensive construction projects are challenging, time consuming, and involve mostly manual tasks for engineering and construction professionals. Emerging real-time wireless remote sensing, data processing, and three-dimensional immersive visualization technologies offer significant potential to improve the design and management of such construction operations. For example, tracking and visualizing the location of resources (people, equipment, material) in real-time and adding novel safety monitoring and alert technology can save life(s) and prevent economic loss while improving work site productivity.

The presentation will first introduce a real-time pro-active safety research framework that was developed at Georgia Tech's Real-time Automated Project Information and Decision Systems (RAPIDS) laboratory. RAPIDS' goal is to advance the industry standard for safer construction design and operations at an acceptable economic cost. The presentation will then focus on the evaluation of automated site monitoring, data recording, warning and alert technology, and its performance in the field. Commercially-available and prototype technology (laser, vision, active and passive radio frequency) will be introduced as these try to provide data that can be used to measurably improve engineering design, work task pre-planning, worker skill level, training and education, and decision making at the site operational level. Results to field trials of novel real-time wireless resource location tracking and proximity warning and alert technology, and their associated data processing algorithms, will be presented. Since 25% of all construction fatalities are related to heavy equipment, a particular case study on worker visibility and equipment blind spots will show why work with or near equipment can be dangerous. A (real-time) three-dimensional immersive data visualization technology is introduced that can be used in live incident prevention, analysis, or in worker training and education. A discussion will include the reactions of union ironworkers that have tested the proposed technologies and what else it takes to implement technology successfully in the field. The presentation will conclude on how technology and research findings can be used in future safety information models.

