

Improving Worker Safety on 'Green' Construction Projects

Safety Risk Identification for High Performance Sustainable Building Construction *Bernard R. Fortunato III, Matthew R. Hallowell, Michael Behm, Katherine Dewlaney*

Safety Risk Quantification for High Performance Sustainable Building Construction *Katherine S. Dewlaney, Matthew R. Hallowell, and Bernard R. Fortunato III*

Safety Risk Mitigation for High Performance Sustainable Building Construction *Katherine S. Dewlaney and Matthew R. Hallowell*

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Overview

The US Green Building Council's Leadership in Energy and Environmental Design (LEED) program represents the largest program in the United States for the measurement, verification, and certification of green buildings. Recent research suggests that LEED projects may be more dangerous to build. This study used detailed case studies to identify and evaluate the safety and health risks associated with design elements and construction management practices associated with LEED certification and assess the level of risk by interviews with 37 designers and contractors with substantial LEED project experience. Finally, researchers used additional interviews to identify strategies for reducing these safety risks. The study revealed 12 LEED credits that appeared to entail higher construction safety risks than traditional, non-LEED alternatives, but that there were feasible prevention through design techniques, technologies and controls, and management strategies that can be implemented to mitigate these risks.

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See abstract:

Hallowell Safety Risk Quantification

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Key Findings

- Workers on LEED construction projects are exposed to work at height, with electrical current, near unstable soils, and near heavy equipment for a greater period of time than on traditional projects.
- Workers are exposed to new high risk tasks such as constructing atria, installing vegetated roofs, and installing photovoltaic (PV) panels that are not present on traditional projects.
- The most significant impacts are a 36% increase in lacerations, strains and sprains from recycling construction materials; a 24% increase in falls to lower level during roof work because of the installation of on-site renewable energy (e.g., PV panels); a 19% increase in eye strain when installing reflective roof membranes; and a 14% increase in exposure to harmful substances when installing innovative wastewater technologies.
- Designers and contractors identified prefabrication, effective site layout, and alternative products as methods to prevent injuries that specifically relate the hazards of each sustainable element.
- Specifying low VOC materials reduces health-related risks for construction workers who perform work in enclosed environments.

Conclusions:

- This research has revealed the substantial need for a detailed lifecycle analysis of the safety impacts of high risk and common sustainable building technologies. Although these technologies may have substantial environmental benefits, many have been shown to result in greater exposures to known occupational hazards during the construction process. Further research is needed to evaluate the safety risks during manufacturing of sustainable materials, shipping, installation, and maintenance.



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