Preventing Falls in Construction: A Collaborative Effort to Launch a National Campaign

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Falls kill.

They are a persistent hazard found in all occupational settings. And, they are the leading cause of construction deaths, accounting for one-third of on-the-job injury deaths in the industry. Each year in the United States, more than 200 construction workers are killed and over 10,000 are seriously injured by falls. Injuries and fatalities from falls represent a major and preventable public health problem. For occupational falls, construction workers face disproportionate risks. Construction—building new structures, renovating and altering existing ones, maintaining and repairing others—whether they are houses, roads, or workplaces, requires both skilled workers and responsible employers. In 2010, there were 9.1 million construction workers (including self-employed workers) in the United States, accounting for 7% of the national workforce (1). Of the 4,547 U.S. workers who died on the job that year, however, 17% (n=780, including both public and private sectors) were construction workers—more than any other single industry sector and nearly one out of every five work-related deaths (2)[1]. The number of fatal injuries in construction increased about 35% from 1992 to 2006, and then dropped 40% by 2010, reflecting fluctuations in the overall construction employment trend during this time period (4,5). Construction is a large, dynamic, and complex industry sector valued at around $807.1 billion (6). Construction worksites are organizationally complex multi-employer sites and present numerous health and safety challenges.

Circumstances associated with falls at construction worksites frequently involve slippery, cluttered, or unstable walking/working surfaces; unprotected edges; floor holes and wall openings. The leading fatal events in construction, however, are falls related to work on roofs, ladders and scaffolds. Combined, these three account for roughly two-thirds of all fatal falls in construction (n=1806 falls during 2003-2009) (4). They represent very different problems, however. In roofing jobs, the key issue is failure to use fall prevention equipment and best practices. For ladders, problems occur when using the wrong type of ladder, using defective ladders, or not using the ladder correctly. Hazards with scaffolds occur when they are assembled incorrectly (e.g., not fully planked, or not level), or during assembly and dismantling. For each of these, improvements in design could reduce hazards. In roofing for example, designs that reduce fall hazards and accommodate the placement of fall protection equipment would be key improvements. Pre-job planning and designs that allow for the installation of stairways earlier in construction process would help to reduce ladder hazards. Better designs and improved pre-job planning could also reduce fall risks associated with unprotected edges, floor holes and wall openings in the construction process and the finished project.

Federal regulations and industry consensus standards provide specific measures and performance-based recommendations for fall prevention and protection. Unsafe practices and low safety culture and climate, nevertheless, persist in construction. Falls in construction that are related to serious violations of Occupational Safety and Health (OSHA) standards are among the most frequently cited violations (7). Fall injuries constitute a considerable financial burden: workers' compensation and medical costs associated with occupational fall incidents have been estimated at approximately $70 billion annually in the United States (8). Regulations and practices need to improve, but so too must the designs of the edifices themselves. It would be imprudent to suggest otherwise.

Conventional regulation, enforcement and consultation

[1]Preliminary data from OSHA for 2011 notes that there were 4,114 U.S. worker fatalities in private industry, of which 721

efforts have been the primary mechanisms used to increase the use of fall prevention by employers. Additional efforts over the years have attempted to use media and other communication tools to provide data on the nature of the falls problem in construction. Falls have continued despite all of these efforts. A successful reduction of fall injury and fatality rates requires the continued concerted efforts of regulators, industry leaders, professional associations, labor organizations, employers, employees, safety professionals and researchers in improving the work environment, implementing effective fall prevention and protection technologies, educating continuously the workforce, and improving the work safety culture. And a single, simple effort to urge the provision (employers) and use (workers) of falls prevention equipment and other strategies is essential. Is there a role for design, and for architects and designers? Absolutely. In fact, designs that remove intrinsic hazards are the best solution.

The National Institute for Occupational Safety and Health (NIOSH) helps to organize stakeholders through its stewardship role through the National Occupational Research Agenda (NORA). A NORA Construction Sector Council was formed to discuss leading priorities in construction safety and health research and practice, and to create national efforts to address them. Through this government-labor-industry partnership, NIOSH engages a number of construction sector stakeholders representing state and federal government agencies, professional organizations, trade associations, labor organizations and private industry to develop and address a list of leading construction research issues within the United States. A key goal among these research topics was formulating social marketing campaign that could simultaneously be based on research, effectively increase safety awareness, and influence work safety behavior to reduce fatal and non-fatal falls from heights.

The NORA Construction Sector Council examined existing campaigns, as well as critical background information, and collected and compiled data, with the aim of duplicating and expanding an effective campaign, if one could be found. After an exhaustive review of more than 30 published and unpublished materials, including articles in peer-reviewed scientific journals, newspapers, magazines, online sources, campaigns, and reports covering the period January 2006 through July 2011, NIOSH and its partners determined that designing a new social marketing campaign would be the best course.

A pilot effort was organized and implemented through focus groups that included construction contractors, on-site supervisors and workers, to address and reduce falls, fall-related injuries and fall-related fatalities among construction workers. Using outcomes from the focus groups, a social marketing campaign was designed, integrating findings from falls prevention research, and effective falls prevention practices. Partners worked together to coordinate printing, publishing, internet and other electronic functions. Based on the evidence, the primary target audience is small residential construction contractors. Supervisors and foremen on job site, and the construction workers themselves, including Spanish-speakers, make up the secondary and tertiary target audiences, respectively. On Workers' Memorial Day, April 28, 2012, a two-year national information and media campaign on falls prevention in construction was launched officially nationally through the this partnership (http://www.stopconstructionfalls.com).

The campaign encourages everyone in the construction industry to work safely and use the right equipment to reduce falls, but there is special emphasis on residential construction. The goal of this national campaign is to prevent fatal falls from roofs, ladders, and scaffolds by encouraging residential construction contractors to plan ahead to get the job done safely; provide the right equipment; and train everyone to use the equipment safely. The campaign has the capacity to report outcomes, and builds in evaluation components. A variety of campaign materials are available to raise awareness about construction falls, and to provide practical information about fall prevention. These include posters, fact sheets, training materials, stickers, and more. New materials have been and will continue to be released on a regular basis over the course of the campaign.

Broad engagement and promotion across the United States has been encouraged, including by state agencies and public health practitioners. The response to the campaign has been enthusiastic and supportive. As of October 2012, over 300,000 people received information about the campaign through the Occupational Safety and Health Administration (OSHA) alone; over 6,000 fact sheets have been distributed in English and Spanish each; and more than 12,000 page views over a two-month period were documented among the websites supporting the campaign. Broadly, home builders, contractors and their site supervisors, labor, professional associations, state and federal government agencies, and academics have supported and endorsed the campaign. In an evaluation conducted four months after the campaign was launched, audience response and other components were assessed.

Despite the early success of the campaign, challenges

remain. Most of the dissemination efforts have been to organizations that are national in scope. Key target audiences in residential construction usually work in small scale operations. Redoubling efforts to encourage distribution to small contractors, however, will be critical to the overall success of the campaign. Reliance on partners and stakeholders to disseminate campaign materials and messages has been the central method by which to maintain partner and stakeholder engagement, to decrease costs, and to increase efficiency. It has been a challenge, however, to encourage dissemination to contractors and others in management (the primary target audience), and not to the workers themselves. Addressing these and other challenges will frame efforts 2013.

It is clear that developing relationships with engineers and architects is critical. Prevention can often best be accomplished through designs that reduce or eliminate hazards (Prevention through Design; http://www.cdc.gov/niosh/topics/PtD/). Even with its focus residential construction, the fall prevention campaign messages apply to iron work, wind power turbine and telecommunications tower erection and maintenance, other construction, and any work at heights. NIOSH and its stakeholders welcome the opportunity to work more closely with architects, engineers and related professionals on this topic.

Injuries and deaths at work are a significant public health problem. Injuries and fatalities in construction take a large toll on its workforce, and the impact extends beyond the workplace to encompass workers' families and communities. Preventing fall-related injuries in construction requires the consistent and concerted efforts of multiple parties using multiple strategies. The new prevention campaign is one such strategy. Others will be needed, and working with professionals who bring a different perspective will be important as the field moves forward.

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Editorial

Wood Design Focus has always provided current industry information. Most topics in this journal have discussed technical aspects of design and the use of wooden building construction. As we design and construct buildings, engineers and architects often tend to focus on the materials and methods of construction. However, the moving forces behind these materials and methods – notably the human workers – often receive little attention. Construction safety is one of the most important worker issues. Conducting work in a safe manner affects worker productivity, worker attitudes and overall worker health. Many times, the discussion of human and structural loading related to construction safety is forgotten or relegated to a lower position.

I began conducting safety-related research about eight years ago. Initially, I was invited by a colleague to contribute to a proposal for a NIOSH safety center. That center has now evolved into the Center for Innovation in Construction Safety and Health (CICSH), under the Occupational Safety and Health Research Center (OSHRC) through Virginia Tech. My colleague challenged me to think differently about my research. How can the understanding of the mechanics of wood influence the safety of construction workers?

I began looking at the effects of lateral buckling of wood composite I-joists as a possible initiator of falls from elevation. At this time, I began to grasp the current severity of falls in construction. Other researchers have gone so far as to call the number of fatalities an epidemic. As I continued pursuing safety research, I began to realize how useful the design of wood structures is to the safety field. Currently, I am the lead investigator in a project examining the use of personal fall arrest systems in residential construction, which is described in this issue. I also currently serve as the Co-Director of the Center for Innovation in Construction Safety and Health (CICSH).

I find myself explaining to both engineers and safety professionals (even once to my department head) why I am researching safety and the importance of involving engineers. One of the important aspects called Prevention Through Design (PtD) directly involves the re-design of buildings to create inherently safer work environments during construction and after construction. There is a genuine need in safety for the innovation and creativity that structural engineers and architects possess. The intersection of safety and engineering is an exciting area of study – combining experimental mechanics, human factors, experimental design, industrial psychology and building construction.

This selection of authors represents a variety of researchers and professionals looking at the intersection of safety and engineering. These articles can help promote worker safety, which ultimately improves worker productivity and health. This issue of Wood Design Focus is part of a two-year Falls Campaign effort to bring attention to the problems associated with falls from elevation. More information is available at http://www.stopconstructionfalls.com. I hope you will be inspired by these articles. As always, we have provided contact information for the authors if you have questions or desire more information.

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