

Data analyses were conducted for 1992-2000 using the Survey of Occupational Injuries and Illnesses (the Annual Survey), maintained by the Bureau of Labor Statistics (BLS). This survey is an estimate of values from a sample of approximately 200,000 private establishments.

To obtain an estimate of costs related to fall-through incidents, the Liberty Mutual "Workplace Safety Index" was used. The Safety Index used their own claims information, along with data from BLS and the National Academy of Social Insurance to determine the total in wage and medical payments paid in 1998.

During 1992-2000, 21,985 serious injuries occurred from fall-through incidents. For 1992-2000, the median DAFW were 35, 25, and 36 for cases involving falls through roof openings, roof surfaces, and skylights, respectively, as compared to 10 DAFW for all types of fall-to-lower-level cases. The Safety Index indicated that the direct costs associated with the 2,069 DAFW fall-through incidents that occurred in 1998 averaged \$37,817.

The total cost of a serious injury is the summation of direct and indirect costs. Generally, indirect costs are assumed to be two to five times the magnitude of direct costs. For this analysis, however, a very conservative estimate is used that assumes direct and indirect costs are of equal magnitude. Thus, the total cost of a 1998 fall-through incident averaged \$75,634. These cost estimates provide employers with the basis to conduct cost-effectiveness analyses for potential workplace interventions, such as guardrail systems or protective skylight screens.

### C3.4

**Title: *Identifying and Controlling Fall Hazards in Routine and Non-routine Tasks***

Author: Kines PA

Introduction: Occupationally related falls from elevated work surfaces, e.g., ladders, scaffolds and roofs, are often cited as one of the main causes of male fatal and serious occupational injuries. This study examined workers' cognitive, behavioural and motivational processes in perceiving, identifying and controlling fall risks.

Method: The study is based on semi-structured personal interviews and on-site investigations with male workers who reported to an emergency department for treatment of injuries due to falls from heights.

Results: A greater number of workers carrying out non-routine compared to routine tasks perceived, identified and attempted to control fall hazards. The non-routine tasks often involved one-time tasks that arose unexpectedly. In many of the routine tasks, the fall occurred in connection with the worker carrying out the task in a unique way.

Discussion: Common, everyday incidents, such as falls from heights, involve relatively simple worker-machine-organisation environments, and yet it appears that it is in this simplicity that much of the origin of falls rests. There is often a mistaken impression that no special knowledge or skill is required to use ladders, scaffolds, etc., which is exacerbated by the restricted area on which to move and/or work on. In half of the cases in this study, the workers were not usually exposed to fall situations, and elevation fall-prevention training would not likely be a 'logical' aspect of their safety education and training.

Conclusion: The results of this study point to a need for widespread education and training in basic ladder safety, possibly beginning already in primary and secondary school programs, e.g., gymnastics. The study leaves the question: can it be expected that companies invest in equipment, training and organisational scenarios for every possible non-routine (one-time) task that, theoretically, might arise?

### Session: C4.0

#### Title: **Injury Surveillance: Mining**

Moderator: Jeffrey Welsh

### C4.1

**Title: *Reducing Injuries from the Fall of Rock in Underground Coal Mines***

Authors: Molinda GM, Dolinar D, Robertson S

#### Reducing Injuries From the Fall of Roof in U.S. Coal Mines

Over a five year period (1995-2000) an average of 620 injuries per year were caused by rock falls in US underground mines. These include many crushing and disabling injuries, and almost all occurred where miners were beneath roof support. NIOSH research has indicated a paradigm shift in traditional thinking about the relative risk of rockfall injuries in coal mines has the potential to dramatically reduce the number of injuries. NIOSH research has focused on identifying:

- Conditions where existing support systems are inadequate, and;
- Best available technology to upgrade the supports.

A roof hazard rating system (SCALE) has been developed which uses roof damage and geologic assessment of roof rocks to indicate a potential injury hazard. The system, calibrated with underground data, can be used in continuous evaluation of the working face. Research at underground mines proves that roof screening on cycle, especially in weak rock, can reduce injuries. Time studies show that additional time for roof screening at the face can be reduced to acceptable levels. There are a number of "best practices" including "pre-linking" of roof screens, rein-

# NOIRS 2003 ABSTRACTS

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