NIOSH-Designed Adjustable Roof Bracket-Safety Rail Assembly

National Institute for Occupational Safety and Health, Morgantown, WV

Research/Design Team:

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Background

For 1998-2005, Bureau of Labor Statistics data indicate a yearly average of 153 workers killed and 3,374 workers severely injured (*multiple workdays missed*) by falls from roof edges, or thru roof holes & skylights

Previous Research

We wanted to know if commercially available edge-guarding products could be used in a perimeter guarding application for roof openings?

Carpenters were recruited to evaluate the two products, which were then compared with a job-built system made from 2-in by 4-in lumber.

Previous Research, cont.

During the previous testing, we had the idea for a walking-working surface that included an edge-guarding system that could move up-slope along with the workers.

Objective of Prototype

- The bracket-rail assembly was to be a scaffolding bracket that provided a walking/working surface with built-in railing for fall protection.
- The rail protection was to be part of the working surface since it would be moved up-slope by the workers.

Prototype Design Goals

<u>The Assembly needed to be:</u>

- Highly adjustable
- Securely fastened to work surface
- Durable
- Easily movable
- Combine edge & hole protection

Multiple Usages

Assembly is designed to prevent workers:

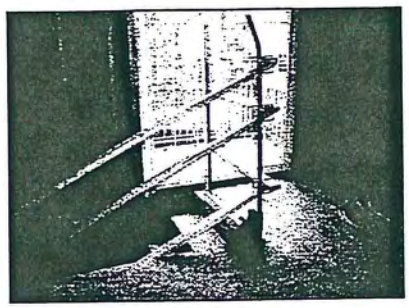
- Falling through unprotected roof/floor holes
- Falling through existing skylights
- Sliding or falling off roof edges
- Falling into stairwells
- Falling from balconies or decks

Assembly Adjustability

- Collapses for easy Storage
- Adjusts to 7 roof pitches:
  6/12 (27°), 8/12 (34°),
  10/12 (40°), 12/12 (45°),
  15/12 (51°), 18/12 (56°), & 24/12 (63°)
- Adjusts to Flat for Stairwell and Floor Hole Guarding
- Design is Patent-pending in U.S. and Canada

Roof Pitch Range:
6/12 (27°) to 24/12 (63°)

Stairwell Guarding



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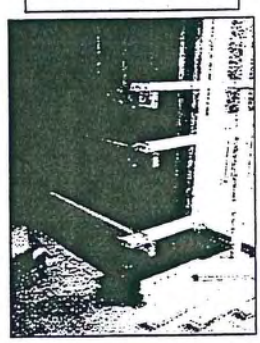
Floor Opening



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Future Activities

- Proposed plans are to work with Ext'n Service of WVU to secure local residential contractors to assist with field evaluation of bracket usage
- 12 to 14 assemblies will be supplied
- Three test periods – pre-intervention, intervention, and post-intervention periods
- Each test period will consist of a specific no. of roofs being built, for ex., 6 for each period

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Data to be Collected

- **Digital video recordings (full-shift)**
- **Physiological responses** (commercial product)
  - **Heart rate, Respiration, Skin temp, Postures**
- **Perception (feedback) responses**
- **Company Economic Evaluation**

Additional Future Activities

- **Establish partnership with metals-products company to manufacture and market bracket-rail assembly as commercial product**
- **Have been communicating with a Florida-based company as a potential partner**

Discussion

- When commercially available, residential & commercial contractors and workers will have an all-purpose fall-prevention system
- If assemblies are used routinely, potential annual reduction in injuries & fatalities, and estimated $$$ saved will be:

1998-2005 Average Fatalities = 153 Injuries = 3374	% Reduction:	Fatalities	Injuries	$$ Millions Saved*
	10	15	337	35.2
	25	38	843	88.1
	40	61	1350	141.1

** Based on Survivors' Benefits, Workers' Comp., Medical Claims, & Indirect Costs. Cost Estimate is $100,000 per incident (Liberty Mutual Workplace Safety Index 2002)*

18th Annual

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