

Overview of Deaths and Injuries Caused by Falls Through Roof and Floor Openings and Surfaces, Including Skylights, 1992-1998

Thomas G. Bobick and Daniel J. Long

NIOSH, Division of Safety Research, Morgantown, WV 26505

Occupational injuries and fatalities caused by falling is a serious problem throughout the United States. Data from the Census of Fatal Occupational Injuries, which is maintained by the Bureau of Labor Statistics (BLS), were analyzed. The analyses indicate that during the 7-year period 1992 through 1998, a total of 4,507 workers died as the result of a fall. Of these, 3,964 (88%) involved a fall to a lower level. An important sub-set of the "falls to a lower level" category involves workers falling through an opening in the floor or roof, or through a floor or roof surface including skylight fixtures already installed. During this 7-year period, 430 workers lost their lives by falling through something – 217 workers (50.5%) died by falling through existing openings (openings created for stairs, elevators, or skylights); 98 workers (22.8%) died when they fell through already-installed skylight fixtures; and, 115 deaths (26.7%) occurred when workers fell through an existing roof or floor surface. Of the 430 deaths, a total of 330 (76.7%) were employed in the construction industry. A total of 76 different occupations were involved in the 430 fatalities. The audience for this workshop will learn which occupations have the greatest number of fatalities caused by falling through (a) skylights, (b) roof openings, (c) floor openings, or (d) roof and floor surfaces.

In addition to fatalities, numerous injuries result from these "fall-through" events. Because of the circumstances associated with these incidents, the resulting injuries are among the most severe cases, in terms of median number of "days away from work." Analysis of the Survey of Occupational Injuries and Illnesses (SOII) database, also maintained by BLS, indicates that 18,320 injuries occurred during the 7-year period, 1992-1998. The total number of days away from work for these injuries was calculated to be 291,572. Results from this study, which will be presented, will provide the audience with an understanding of the severity of injuries that occurred during the years 1992 to 1998 when workers fell through (a) floor openings, (b) floor surfaces, (c) roof openings, (d) roof surfaces, and (e) existing skylights.

These analyses highlight the significance of "fall-through" types of events. The analyses identify the need to modify current work practices and to utilize appropriate existing fall-prevention technologies.

Falls Through Roof and Floor Openings and Surfaces

Thomas G. Bobick, Ph.D., P.E.

Daniel Long, M.S.

Division of Safety Research
Morgantown, WV



1



Fall To Lower Level

- Third leading cause of death (behind highway crashes, homicides) for workers in all U.S. industries, 1995-1998. (*Bureau of Labor Statistics, 1996-1999*)
- Leading cause of death in the construction industry.
- Typically cause 1/3 of all deaths in construction industry (7-yr range: 29% to 34%)
- Annually cause 100,000 severe injuries (days-away-from-work cases) in all U.S. industries.



2



Study Methods

Fatal Injuries

Analysis of *BLS Census of Fatal Occupational Injuries* (CFOI) for 1992 thru 1998. CFOI uses multiple sources to collect these data and is a count of all occupationally related fatalities.

Non-Fatal Injuries

Analysis of "days-away-from-work" incidents in *BLS Survey of Occupational Injuries and Illnesses* (often called the Annual Survey) for 1992 thru 1998. It is an estimate of values based on a sample of approx. 165,000 business establishments.



3



In construction, typically the median number of days away from work for "all types of falls" = 7, and the median number of days away from work for "falls to lower level" = 10.

The median number of days away from work for "fall-through" types of incidents ranges from 10 to 43 days.



4



Workplace Designations

Fall through:

- Existing floor opening (FO)
- Floor surface (FS)
- Existing roof opening (RO)
- Roof surface (RS)
- Skylight (SL)

(All of these workplaces are subject to OSHA regs:
29 CFR 1910.23 and 29 CFR 1926, Subpart M)

CDC

5

NIOSH

Data

BLS, CFOI, Fatalities, 1992 - 1998

- Total fatal falls, all industries ('92-'98) = 4,647
(avg / yr = 664)

- Total "fall-to-lower-level" fatalities,
all industries ('92-'98) = 4,087
(avg / yr = 584)

- Total "fall-through" deaths for 7 years = 430
(avg / yr = 62)

(430 ÷ 4087 = 10.5% Thus, 1 of every 10 deaths caused
by falling to a lower level is a "fall-through" incident.)

CDC

6

NIOSH

Yearly Summary from CFOI

<u>Year</u>	<u>Fall to L.L.</u>	<u>Fall Thru</u>	<u>%</u>
1992	507	37	7.3
1993	534	62	11.6
1994	580	54	9.3
1995	578	73	12.6
1996	610	64	10.5
1997	653	71	10.9
1998	625	69	11.0

CDC

7

NIOSH

Data, cont'd

Total "fall-through" (FT) fatalities,
all industries ('92-'98)

<u>Workplace</u>	<u>7-yr total</u>	<u>avg FT deaths/yr</u>
FO	109	16
FS	11	2
RO	108	15
RS	104	15
SL	98	14
Total	430	62

CDC

8

NIOSH

Data, cont'd

**BLS Annual Surveys, Fall-Through Incidents,
Days-Away-From-Work Injuries, 1992 - 1998**

Workplace designation	Total Injuries for 7 yrs	Total days away from work for 7 yrs, (avg DAFW / inj)	Median days / inj
FO	7322	107,702 (15)	10
FS	5336	77,578 (15)	11

CDC

9

NIOSH

Data, cont'd

Workplace designation	Total Injuries for 7 yrs	Total days away from work for 7 yrs, (avg DAFW / inj)	Median days / inj
RO	1530	29,723 (19)	43
RS	3184	56,548 (18)	16
SL	948	19,997 (21)	36

CDC

10

NIOSH

Summary

- Over the period 1992-1998, a total of 430 fatalities occurred from falling through an opening or a work surface.
- Over the period 1992-1998, a total of 18,320 severe injuries (DAFW) occurred, resulting in a total of 291,548 days (1,166 equivalent yrs) away from work.

CDC

11

NIOSH

Summary, cont'd

	(1992-1998) <u>430 Deaths</u>	(1992-1998) <u>18,320 Injuries</u>
Openings	50%	48%
R & F Surf	27%	47%
Skylights	23%	5%

CDC

12

NIOSH

Conclusions

- Fatalities still occur with regularity.
- Non-fatal “days-away-from-work” incidents are numerous and quite costly.
- Work surface openings should always be guarded.
Easily installed guarding and nets can be used to protect the workers.
- Safety screens should cover existing skylights.
When compared to the cost of a fatality or a severe injury, the cost of the protective screen is minimal



13



Recommendations (Prevention)

- Company management should encourage and support safe behavior on the job, and provide workers with appropriate safety equipment.
- Companies should purchase and endorse the use of protective measures, such as skylight screens, easily installed barriers around openings, or nets under work surface openings.



14



Recommendations, cont'd

- Workers should take the time to install skylight screens and protective barriers around openings at the worksite.
- Workers should view the value of protective equipment as the same as using a seat belt in their vehicles – if used, it *can* save a life!



15



Research Questions

- Why is current technology not being used to guard work surface openings and existing skylights?
- How can the use of current technology be increased?



16



POWER



PARTNERSHIPS

CONFERENCE PROCEEDINGS

MAY 21-23, 2002

Donald E. Stephens Convention Center
Rosemont, Illinois

1G

Falls Through Roof and Floor Openings

Presented by:

Thomas Bobick

NIOSH, Division of Safety Research

Daniel Long

NIOSH, Division of Safety Research