

Deaths from Falls In Construction, 1997

Poster Session Presentation

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Abbreviations

BLS U.S. Bureau of Labor Statistics

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Several studies point to falls as the leading cause of death in construction (see references list, page 11). According to the U.S. Bureau of Labor Statistics (BLS), ladders, and scaffolds account for about 28% of work-related deaths (BLS 1996).

Although BLS data show that death rates from falls are much higher for ironworkers compared with other construction trades,¹ a detailed breakdown of data on fatal falls has not been provided.

This report details fatal falls to a lower level by reported cause of injury and employment status for 1997 using data from the BLS Census of Fatal Occupational Injuries. Hours worked data cannot be broken down by cause of injury (e.g., roof or ladder). Because of potential technical statistical problems, the numbers in this report should be used only to identify the main problems—such as, that most falls occur from a roof edge (see fig. 2).

Methods

The Census of Fatal Occupational Injuries for 1997 contained 373 deaths from falls to a lower level. From that number, the authors eliminated nine case records involving fall from a roof or ladder. So, 364 records of falls to a lower level were analyzed using a Microsoft Access 97 database.

The 364 fatal falls were classified as follows, using the Census of Fatal Occupational Injuries event code variable and case narratives:

Roof	Ladder
Roof edge	Scaffold
Roof opening	Aerial lift
Skylight	Girder or other structural steel
Through roof surface	Tower
Roof, other	Non-moving vehicle
Building	Other
Floor or wall opening	Unknown.
Building	
Building, other	

A fall from a roof edge was identified when the event code was fall from roof edge and the code variable was the ground, the narrative stated fall from roof edge, or no indication of other circumstances.

This study focused on two types of construction:

- Single-family home or townhouse
- Other buildings (commercial, industrial, public, etc.)

This analysis classifies a fall as occurring in a single-family home or townhouse (and the General Building Contractors-single-family houses) or in other buildings (and the General Building Contractors-other buildings).

another type of construction), if the location field was classified as home, or if a key word in the narrative indicated a single-family home (for instance, home, narrative indicated a single-family home (for building was used if the industry code variable was General Building Contractors-industrial buildings and warehouses, or General Contractors-nonresidential buildings, other than industrial. A location code variable with the classification apartment, industrial place and premises, public building, apartment, industrial place to be classified as other building. Keywords in the narrative category of single-family home included elevator, restroom, suspended scaffold, and warehouse.

The employee status code variable was used to determine whether a worker was self-employed.

Findings

Fatal Falls by Type of Fall

- " One-third of fatal falls were from roofs (fig. 1). Most towers.
- " Half of the roof falls were from the roof edge, and one-third from skylights (fig. 2).

Figure 1. Fatal falls by cause, construction, United States, 1997

Source: U.S. Bureau of Labor Statistics data.

Figure 2. Subcategories of falls from roofs, construction, United States, 1997

Note: 122 total fatal falls from roofs.
Source: U.S. Bureau of Labor Statistics data.

Fatal Falls by Type of Construction

- " The proportion of fatal falls from roofs of buildings, accounting for about 40% of falls (table 1). Falls from roofs during single-family home construction, but only half of the falls from roofs during other building construction.
- " For both types of building construction, about one-sixth of the falls were from scaffolds.
- " Falls from ladders accounted for almost one-third of fatal falls during single-family home construction, compared with one-sixth for other building construction falls.

**Table 1. Number of fatal falls from buildings
by type of building and cause, United States, 1997**

	Single-family homes	Other buildings
Falls from roof		
Roof edge	16	46
Roof opening		20
Skylights		14
Through roof surface		13
Roof, other	5	5
Total roof falls	24	98
Falls from ladder	20	40
Falls from scaffold	10	43
Falls from girders or structural steel		29
Falls from aerial lifts		14
Falls through wall or floor openings	7	10
Falls from building, other		5
Falls, other		6
Falls, unknown		
Total falls	65	248
% of total falls	18%	68%

Does not meet BLS publication criteria.

Note: Table includes only falls to a lower level.

Source: U.S. Bureau of Labor Statistics data

Fatal Falls by Age Group

- " Although falls from roofs are one-third of the total, they accounted for 18% of all fatal falls for workers under age 25 (table 2).
- " Ladder falls accounted for 28% of all fatal falls for workers over age 25. About 60% of ladder falls are in the over-44 age group.³

Table 2. Fatal falls by age group, construction, United States, 1997

Age group (years)	Total falls		From roof		From ladder		From scaffold		Other falls to lower level	
	No.	%	No.	%	No.	%	No.	%	No.	%
Under 25	45	12%	23	19%		5%	7	11%	12	10%
25-44	186	51%	63	52%	23	37%	33	54%	67	57%
Older than 44	133	37%	36	30%	37	59%	21	34%	39	33%
Total	364	100%	122	101%	63	101%	61	99%	118	100%

Does not meet BLS publication criteria.

Note: Falls to a lower level. Some categories do not add up to 100% because of rounding.

Source: U.S. Bureau of Labor Statistics data

Fatal Falls by Occupation

- " Single-family home construction, with 18% of fatal falls, accounted for 18% of falls among carpenters and painters, and half of all falls among carpenters (fig. 3) (The BLS data for residential construction categorized self-employed workers as managers and administrators.)
- " Roof falls caused 37/98 (38%) of construction laborer falls (23%), and 15 ladder falls (15%).
- " Falls from girders or structural steel caused 22/39 (56%) of ironworker falls from by 8 roof falls (21%) and six scaffold falls (15%).
- " Roof falls cause 31/39 (79%) of roofer fall deaths, roofers had almost half of all skylight falls.
- " Roof falls caused 11/36 (31%) of carpenter fall deaths, followed by 6 floor or wall opening deaths (17%), and 5 scaffold deaths (14%).
- " Ladder falls caused 9/19 (47%) of painter fall deaths.

Figure 3. Fatal falls by occupation, single-family
1997

Note: Data include only falls to a lower level. Ironworkers and elect Data include only falls to a lower level. Ironworkers and
1997.

Fatal Falls of Self-Employed Workers

" Self-employed workers accounted for 44% of fatal falls during single-family home construction (fig. 4) .

Figure 4. Distribution of fatal falls among self-employed construction workers, by occupation, single-family and all construction, United States, 1997

Note: Falls to a lower level. Other occupations had fewer than 5 deaths in 1997 .

Source: U.S. Bureau of Labor Statistics data.

Discussion

Causes of Fatal Falls to a Lower Level

- * □ This analysis is consistent with previous findings that falls from roofs, scaffolds, and ladders are the main causes of deaths from falls.
- * □ The large percentage of falls from roof edges among roofers points out the need for targeted prevention efforts. Most of these falls were associated with a lack of fall protection.
- * □ Falls from aerial lifts and towers need investigation.

Type of Construction

- * □ One-fifth of all construction falls occurred during single-family home construction.
- * □ Ladder-related falls in single-family home construction account for about one-third of all ladder falls and double that for other building construction. Scaffold falls in single-family home construction account for one-sixth of all scaffold falls. These numbers focus attention on the hazards of single-family home construction.
- * □ Specific hazards vary in severity among different types of construction probably because of the different tasks and methods required. Assessment of contractor and worker knowledge and attitudes toward safety should be conducted.

Victims Ages

- * □ Workers under 25 years experienced more fatal roof falls than other types of falls.
- * □ Most falls from ladders were among workers older than 44.
 - " Balance is critical on ladders and could be a possible factor in falls from ladders for older workers.
 - " Body weight and ladder stability should also be further explored, given that weight tends to increase with age.

Construction Occupations and Falls

- * □ The patterns of falls for the occupations suggest a need for task-specific approaches to fall interventions. For instance, ladder training might be warranted for painters.
- * □ Falls from roof edges and skylights should be addressed for roofers.
- * □ The numbers of fatal falls of managers and administrators was surprising. Half of these managers and administrators were self-employed, but appeared to be acting as craft workers in many instances. This also suggests the importance of conducting safety training for all workers on construction sites.

Conclusions and Recommendations

This study found differences in the distribution of fatal falls depending on the type of construction, occupation, age and employment status. This descriptive analysis of fatal falls to a lower level can help with selecting further research and possible interventions to reduce fall-related deaths. Recommendations include:

- * □ Fall safety training for all workers at risk of falling, including self-employed workers.
"Self-employed workers should be targeted for safety and health programs; their actions can endanger other workers.
- * □ Evaluation of safety monitor and safety line systems
- * □ Development of task-specific interventions
"For roof work, additional studies are needed to determine the effectiveness of safety monitors and warning lines.
- * □ Development of interventions for single-family home construction
- * □ Research into why older workers have a high proportion of falls from ladders.

References

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End Notes

1. For instance, in 1995, death rates from falls per 100,000 full-time equivalent workers were 51.7 for ironworkers, 26.4 for roofers, 12.7 for laborers and helpers, and 5.0 for painters. See The Center to Protect Workers Rights 1998, 34a.

2. That number was updated to 377 in a more recent BLS report.

3. Chi-square tests confirm that statistically significant differences exist in age distributions of roof versus ladder falls (p-value << .05), as well as of scaffold versus ladder falls (p-value < .05).