

## APPENDIX A: CASE STUDY #1

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- When removing old shingles at the peak of a pitched roof of a residential building, a roofing helper struck with his body the newly stacked bundle of shingles located next to him.
- The victim chased the shingles to stop them from falling off the roof, lost his balance, and fell 16.5 feet.

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(Excerpt<sup>1</sup> from FACE website (Case 9816) with partial modifications in the scenario)

*On July 18, 1998, a 25-year-old male roofer helper (the victim) died after falling 16.5 feet from a roof to a concrete basement way while trying to stop a bundle of shingles from sliding off a roof edge.*

*The company owner had decided to replace the shingles on the roof of his residence and his adjacent garage. He and his eldest son, the company co-owner, had instructed his youngest son, 25 years of age, to ask two of his friends to help him remove the old fiberglass shingles from both structures. A 25-year-old (the victim) and a 16-year-old agreed to help with the job.*

*On the first day of the job, all five workers carried bundles of new shingles to the peak of the residence's 5.5:12 (5.5 inches of rise for every 12 inches of width) pitched roof. The shingles were stacked 3 or 4 bundles high along the roof's peak. The 25- and 16-year-old workers then took shovels up the ladder to the residence's roof while the father and two sons climbed a ladder to the garage roof to determine what materials would be needed to complete the garage roof.*

*As the two men began removing the shingles the victim contacted a stack of shingles with part of his body, or the shovel, and a bundle began to slide down the back side of the roof. The victim began to chase the bundle in an attempt to retrieve it. None of the other workers saw the victim fall off the roof, but he apparently lost his balance and fell 16.5 feet from the roof to a concrete driveway below, striking his head on the concrete.*

*...The co-owner stated that approximately 0.5 hours before the incident, he knocked a whole stack of shingles off the back side of the roof, damaging the eaves. He stated that at that time he instructed the workers to let the shingles go if the materials began to slide down the roof.*

## Case Study #1 Discussion

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- Questions
  - What unsafe action(s) caused the incident?
  - What action(s) can be taken to avoid the incident?

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### Assumptions

**Activity:** Removing old shingles (fiberglass shingles) and installing new shingles (3-tab asphalt composite roofing shingles (1'3"4"))

**Location:** Peak of the pitched roof of a residence. (Slope: 24 degree above horizontal)

**Work expectation:** Doing a good, safe job in a reasonable time

**Scenario:** When removing old shingles, the worker struck with his body the newly stacked bundle of shingles next to him at the peak of the roof. He then chased the bundle to stop the shingles from falling, lost his balance, and fell 16.5 feet.

### Questions

Ask what unsafe action(s) caused the incident. Items to discuss:

Safety issues of the work on open-sided roof edges

Ask what action(s) can be taken to avoid the incident. (Which is the correct, or safe, way of performing the task? **The answer is C.**)

### Items to discuss:

Slide-guard – Can only be used up to 25 feet when several site requirements are met (1926.500 Appendix E).

Guardrails – Each employee on a steep roof with unprotected sides and edges 6 feet (1.8 m) or more above lower levels shall be protected from falling by guardrail systems with toeboards, safety net systems, or Personal Fall Arrest Systems (PFAS) (1926.501(b)(11)). Practically, guardrails are not intended for steep, pitched roofs.

Not all the roof edges in Option B are protected.

Harness and lifeline – Should be able to withstand 5,000 pounds of force.

Make sure the harness fits and is not defective when using PFAS.

Always stay connected/tied off; Ensure that all anchor points are safe.

## APPENDIX A: CASE STUDY #2

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### Laborer Killed in Fall Through Roof

- A 40-year-old laborer/helper died when he fell through an opening in a warehouse roof.
- He fell approximately 27 feet to the floor below.

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*The employer in this incident was a roofing contractor that had been in operation for 22 years and employed 12 workers. The employer had a written safety policy and safety program. General written safety rules were reviewed with all employees upon hire. Training was accomplished on the job. Tailgate safety meetings were conducted by the job foreman when necessary. Safety meetings were held prior to the start of each job to discuss the safety hazards associated with that job. The victim had worked for the employer for 12 years and had 15 years prior experience. This was the first fatality experienced by the employer.*

*The employer had been contracted to replace the fiberglass insulation and corrugated metal roof panels on an 80-foot-wide by 140-foot-long church roof with a 1:12 pitch. A five-man crew (general superintendent, foreman, roofer, and 2 sheet metal mechanics) was sent to the site to complete the task. The men were to remove 36-inch wide sections of metal roof panels and insulation at a time and replace them with new panels and insulation. This required removing three, 3-foot-wide by 6-foot-long panels and replacing them with the new 20-inch-wide by 16-foot-long panels.*

*To remove the panels, the roofer would hold the end of the old panels up and pull them back as the sheet metal mechanics removed the screws that attached the panels to the roof joists. Because the men were installing panels smaller in width than those being replaced, open space with exposed insulation existed around the work area.*

*At 3:00 p.m. on the second day at the site, work had progressed to a point where the men had completed work on an area measuring approximately 25 feet by 115 feet. As the victim finished removing the screws holding the next piece of old panel, he stood up and stepped backward into an opening approximately 3 feet by 6 feet that was covered only with fiberglass insulation, and fell 30 feet to the hardwood floor inside the church, striking his head.*

## Case Study #2 Discussion

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- Questions
  - What unsafe action(s) caused the incident?
  - What action(s) can be taken to avoid the incident?

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### Assumptions

- **Activity:** Removing screws of the old metal roof panels. (panel type: corrugated metal panel; Old panel size: 3 feet by 6 feet; New panel size: 20 inches by 16 feet)
- **Location:** Roof deck of a church (Roof size: 80 feet by 140 feet, with a 1:12 pitch (angle=4.76 degrees))
- **Work expectation:** Doing a good safe job in a reasonable amount of time
- **Scenario:** After removing the screws that attached the old metal roof panels to the roof joists, a sheet metal mechanic stood up, stepped backward and fell 30 feet through a roof opening covered only with fiberglass insulation. The worker struck his head on the floor and died

### Questions

Ask what unsafe action(s) caused the incident. Items to be discussed:

- Safety issues when removing old metal roof panels and installing new ones
- Safety issues for roof openings

Ask what action(s) can be taken to avoid the incident. (Which is the correct, or safe, way of performing the task?)

### The answer is C)

Items to be discussed:

- Guardrails and its suitability - notice that slide guard is not an acceptable means of fall protection here!
- Plywood that is (1) thick enough and (2) marked with the word "HOLE" for securely covering up roof holes and openings (The plywood should have a safety factor of 2 based on OSHA standards).
- Don't sit or walk on skylights or other openings.
- Harness and lifeline - should be able to withstand 5,000 pounds of force.
- Make sure the harness fits and is not defective when using Personal Fall Arrest Systems (PFAS).
- Always stay connected/tied off.
- Ensure that all anchor points are safe.

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**FALL PROTECTION/FALL PREVENTION**

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