Carpet Installer Dies after Falling 32 Feet at a Commercial Jobsite

FACE/WA
Fatality Assessment and Control Evaluation

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Washington State Department of Labor & Industries

SHARP
Safety & Health Assessment & Research for Prevention

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DEFINITIONS

ANSI	American National Standards Institute
APP	Accident Prevention Program
ASME	American Society of Mechanical Engineers
DOSH	Division of Occupational Safety and Health
FACE	Fatality Assessment and Control Evaluation
FPWP	Fall Protection Work Plan
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PIT	Powered Industrial Truck
SHARP	Safety and Health Assessment and Research for Prevention
WA	Washington State
WAC	Washington Administrative Code

SUMMARY

On November 12, 2009 a 45-year-old carpet installer was fatally injured when he fell 32 feet from a window striking his head on the concrete sidewalk below. The victim and a coworker were installing carpet in a commercial building that was under construction. The workers were attempting to unload rolls of carpet from a three-sided box, also referred to as a skip box, through a window. The victim was working from inside the skip box which was elevated to an unfinished fourth story window by a variable reach all-terrain telehandler. According to his coworker, the victim had one foot on the window sill and one foot on the end of a carpet roll that was protruding from the skip box. The portion of the carpet roll the victim was standing on was not supported by either the window sill or the skip box. When the victim lifted his foot off the window sill, all his weight shifted onto the roll of carpet. The carpet roll and victim fell 32 feet to the concrete sidewalk. His head struck the concrete sidewalk, and a second roll of carpet fell out of the box and landed on him. EMS was called immediately and arrived on the scene quickly. The victim was transported to the hospital where he later died from injuries sustained from the fall.

To prevent similar incidences the Washington State Fatality and Control Evaluation Team (FACE) recommends that employers, carpet installers and other workers handling materials at elevation should follow these guidelines:

- **Use a safe and approved method to elevate, handle and deliver materials at elevation.**

- **Ensure that guardrails on windows at elevated heights are secured and cannot be removed except by a competent person. Use fall arrest systems when guardrails are removed and place signs or placards showing that workers should not step or lean outside window.**

- **When using powered industrial trucks (PITs) such as telehandlers to elevate and deliver carpet, consider using carpet poles and rug rams.**

Building designers and general contractors should:

- **Integrate fall prevention strategies into the initial design of the building and throughout the construction operational plan.**

- **Designate a specific competent person or persons to be responsible for developing, training, monitoring, and enforcing site-specific safety plans.**

INTRODUCTION

On November 12, 2009 the Washington State Fatality Assessment and Control Evaluation (FACE) Program was notified by Washington State's Department of Occupational Safety and Health (DOSH) of the death of a 45-year-old male carpet installer.

After reviewing the DOSH investigation report, the WA FACE investigators interviewed the employer of the victim. During the interview, the employer provided information regarding the history, organization, and the health and safety programs of the company as well as provided insight surrounding the incident. During the course of the investigation documents reviewed included police reports and interviews with witnesses, medical examiner's report, and DOSH investigation documents and photographs.

Employer

The employer owns a small non-union floor covering installation company that has been in business for approximately 35 years. They have 2 full time employees and also use contractors for some jobs. The employer has a written safety plan for its employees and conducts safety meetings before starting a new job to review hazards associated with the job. The employer said that they discuss fall hazards at new construction sites but most of their safety discussions revolve around general safe work practices such as proper use of carpet cutting blades and proper lifting techniques. According to the employer, falls from elevation are not perceived as a job hazard among carpet installers.

The employer was contacted by the subcontractor responsible for the interior finishing of the building about installing the carpet. The subcontractor was hired to complete the interior of the buildings by the general contractor. This subcontractor then hired the employer as a subcontractor to install the carpet. The relationship between contractor, subcontractor, and employee is often not easily determined and there can be many layers.

The employer was initially apprehensive to take the installation job due to the distance he would have to travel from his home office and the amount the job paid. Because of this, the employer contacted the victim who lived in the area and hired him to complete the job. The employer did not have a written contract with the victim and believed that the victim was a subcontractor and not an employee. The employer did not realize that because he was providing the carpet and materials for installation that he was the victim's employer in this situation. The employer did not provide any safety training as

he knew the victim was experienced and owned his own carpet installation business for several years. The employer of the victim was ultimately cited for two violations of Washington State Administrative Code. The first was for not having a written fall hazard specific Accident Prevention Program (APP), Washington Administrative Code (WAC) 296-155-110(2)[1], and the second for not ensuring his employee was protected from a fall from 10 feet or more by utilizing an approved fall protection system WAC 296-155-24510[2].

Victim

The victim owned his own carpet installation business since 1990. Since that time, he had completed similar jobs for, as well as worked side by side with the employer. The victim was considered an experienced carpet installer and had received carpet installation trainings from several carpet manufacturers. The victim was hired to make the cuts and install the carpet at the commercial construction site that was being built. He was working at the site with a young coworker who had helped him periodically on jobs in the past and was not considered an experienced carpet installer.

Carpet

The carpet sections were approximately 12 feet long and weighed between 80–100 pounds. To load the carpet sections into the skip box, they were folded in half and then rolled up. This was referred to as 'burritoing' the carpet (photo 1) by the employer of the victim. The carpet rolls had an approximate diameter of 2 feet. Six rolls of carpet were loaded into the skip box.

Telehandler and three-sided skip box

The variable reach forklift was a JLG Skytrack Telehandler model number 10054 (photo 2), a specific type of powered industrial truck (PIT), and was rented and operated by the general contractor. This telehandler had a carrying capacity of 10,000 pounds and a maximum lift height of 53 feet and 2 inches (16.21 meters). The three-sided skip box measured 4 feet high by 8 feet wide and 4 feet deep. It was believed that the skip box was built onsite. The carpet rolls extended outside the edge of the skip box by approximately 30 inches. According to the employer of the victim, this is a common method for delivering carpet rolls to the upper levels of construction sites when elevators are not allowed to be used.

Window

The unfinished window through which the carpet rolls were to be loaded into the building measured 58 inches wide by 64 inches high and had a sill height of 26 inches (photo 3 and 4). The window was approximately 32 feet from the ground. The protective guardrail that was fitted over the window was 42 inches high (photo 6). There were no warning signs, placards, or anchor points located near the window. The guardrail had no lock or means of securing it and could be removed by anyone (photo 5).

INVESTIGATION

On November 12, 2009 the two carpet installers arrived on the jobsite between 8:30–9:00 AM. They had been working on this site for approximately two weeks. Prior to elevating the carpet, one of the installers worked with the operator of the telehandler to load the carpet rolls into the skip box (photo 1). The carpet rolls were loaded into the box by laying them down flat on the floor with approximately 30 inches of the carpet roll protruding from the box (figure1). The skip box was then elevated to the fourth floor unfinished window by the telehandler (photo 2).

According to the employer, this is not the preferred or typical method of loading the carpet rolls into a skip box. The employer said that the preferred method is to stand the carpet rolls upright (figure 2) so a worker can reach out and grab the top of a carpet roll and have it fall into the window opening. The reason the installers positioned the carpet rolls flat in the skip box is unknown.

After loading the carpet rolls into the skip box, the two carpet installers took the stairs to the fourth floor to unload them. The operator of the telehandler elevated the skip box approximately 32 feet to the window. The edge of the skip box was approximately 30 inches away from the lower ledge of the window (figure 3). The victim removed the window's protective guardrail then attempted to pull the carpet rolls in through the window. The victim was trying to push in a roll of carpet while standing outside of the window. He had one foot on the window sill and his other foot on a different roll of carpet that was still in the skip box.

According to his coworker, who was inside the building, the victim appeared to have lifted his foot off the window sill and shifted all of his weight onto the carpet roll. The carpet roll apparently gave way under his foot and both the carpet roll and victim fell 32 feet to the concrete ground below. A second roll of carpet then fell from the box and landed on top of the victim. Exactly how the carpet roll gave way underneath him or what caused the second carpet roll to fall is unknown. When the victim raised his foot off

the window sill the carpet roll may have bent under his weight or possibly flipped up and out of the skip box. The second roll of carpet may have fallen due to the victim attempting to grab it to prevent him from falling, or possibly due to him hitting the end of the carpet roll when he first started falling.

When the victim fell, he landed with his back on one of the carpet rolls while the back of his head and his right shoulder hit the concrete. Immediately after the victim hit the ground the operator of the telehandler asked another worker that was on the site to call 911. Emergency response teams arrived in approximately 10 minutes and transported the victim to the hospital by ambulance. The victim passed away at 12:39 PM, approximately 2 ½ hours after his fall.

CAUSE OF DEATH

The medical examiner listed the cause of death as subarachnoid hemorrhage (brain bleed), right lung laceration, multiple rib, pelvic and spinal fractures, contusion of heart and blunt force injury of head and torso.

RECOMMENDATIONS AND DISCUSSION

The following recommendations are intended for employers, carpet installers, and other workers who perform or plan the loading and unloading of materials at elevation.

Recommendation 1: Use a safe and approved method to elevate, handle and deliver materials at elevation.

Discussion:

Safe methods for material handling at elevation include the use of elevators, material hoists, or scaffold platforms with guardrails and toe boards. The victim was outside the building and inside the skip box which was supported by the telehandler. Utilizing a skip box to raise and deliver the carpet rolls to an elevated unfinished window inherently put him in a fall hazard situation.

Skip boxes elevated by telehandlers or construction forklifts should only be used to deliver materials when workers will not be exposed to fall hazards. For example, when the skip box can be elevated and set down inside the building. This means that the window or other opening must be large enough to accommodate the skip box when loaded with materials.

Boom-supported elevated work platforms can be used to work safely. The Washington State rule, WAC 296-869[3], describes requirements for the design, construction, and training related to elevated platforms. In addition, when working from a boom-supported elevated platform you must make sure that it meets the designs and construction requirements of ANSI A92.5-1992, WAC 296-869-30015[4].

Using the building's elevator removes the hazard of moving materials at elevation. At the incident location there was an operational elevator but workers were not allowed to use it for the transportation of materials. According to the employer, it is common practice for functioning elevators at a new construction site to be restricted from being used for the transportation of materials. This is often because the elevator has yet to be inspected or the proprietor does not want the elevator damaged. Allowing workers to use the elevator would have prevented the victim from having to remove the guardrail and work from the skip box outside of the window, thus eliminating the fall hazard.

A temporary elevator permit is one method that allows contractors to use an existing elevator to move materials and help minimize the fall hazards associated with moving materials at elevated heights. Elevators should conform to Elevator and Escalators standard, ANSI/ASME A17.1. For temporary operating permits for elevators in Washington State contact LNI Elevator Section at (360) 902-6132 or email at Elevatorsect@Lni.wa.gov. Workers can add padding or other barriers to protect the elevator from damage associated with transporting materials. For long-term construction projects, material hoists are recommended to minimize the risk of fall hazards. These hoists are used for the transportation of materials only and should be built with a safety factor of 5[5]. For additional information on ANSI safety standards for material hoists see www.ansi.org/Default.aspx. For Washington State safety standards for material hoists see WAC 296-155-530(2).

The use of scaffold platforms (photo 7) equipped with guardrails and toe boards for unloading materials is another method to reduce fall hazards[5]. By providing workers with a larger guarded surface area to stand on while moving materials, scaffold platforms reduce fall hazards. Scaffold platforms also eliminate the fall hazard gap created by using the three-sided skip box. Common types of scaffolding are wood pole scaffolding, tube and coupler scaffolding, and tubular welded frame scaffolding. For more information on rules regarding scaffolding in Washington State, see WAC 296-874[6].

<u>Recommendation 2</u>: Ensure that windows at elevated heights have guardrails that are secured and can only be removed by a competent person. Use fall arrest

systems when guardrails are removed and place signs or placards showing that workers should not step or lean outside window.

Discussion:

Due to the size of the carpet rolls, the victim needed to remove the guardrail from the window in order to move the carpet rolls into the building. Removal of the guardrail in combination with the distance between the edge of the skip box and the window created a serious fall hazard. Without a lock or other means of securing the guardrail, workers could remove it from the window, exposing others to a fall hazard. A secure guardrail system will help prevent workers from creating a fall hazard for themselves or others.

Guardrails should only be removed by a competent person or persons. A competent person, defined by the Occupational Safety and Health Administration (OSHA) is "a person who is capable of identifying existing and predictable hazards in the surroundings or working condition which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them". The competent person should identify and assess the hazards associated with the task and ensure there is an appropriate fall arrest system in place before removing the guardrail.

The victim was working outside the window in order to move the carpet rolls in through the window. Workers should never lean out of windows, stand on window ledges, or work from material raising devices without using a fall arrest system. A fall arrest systems including a full body harness secured to an anchor point would have prevented the worker from the long vertical drop[5].

Despite the use of a telehandler to raise carpet and other materials to upper level unfinished windows, there were no signs or placards reminding workers of fall hazards and to keep their body inside the building. The use of signs provides a visual reminder of fall hazards and for workers to use fall protection[5] (photo 6).

<u>Recommendation 3</u>: When using telehandlers to elevate and deliver carpet, consider using carpet poles and rug rams.

Discussion:

The distance between the window ledge and the skip box holding the rolls of carpet was approximately 30 inches due to the carpet roll overhang. This hazard could have been avoided with the use of carpet poles or rug rams (photo 8). Carpet poles or rug rams,

commonly referred to as a “stinger” according to the employer, allow for the carpet rolls to be elevated and placed inside the window, preventing a worker from having to reach outside the window and eliminating the fall hazard. Stingers are available in various sizes and weight capacities and can be carriage or fork mounted onto a variety of powered industrial trucks.

According to the employer, there are limitations to the use of stingers. First, stingers work best for elevating carpet to first and second stories, as they are often not compatible with forklifts used to elevate materials to higher elevations. Second, when carpet needs to be raised to higher elevations, it is more difficult to prevent the carpet from bouncing around and damaging the window or surrounding area. Third, the carpet that will be installed at upper levels often has cuts made at the ground level. This can prevent the ability of the carpet to safely wrap around the stinger.

In addition, building designers and general contractors should:

<u>Recommendation 4</u>: Integrate fall prevention strategies into the initial design of the building and within the construction operational plan.

Discussion:

When architects or engineers are designing a building and general contractors are planning the order of operations for the construction process, safety measures for the handling of materials at elevation should be incorporated. This should be done to integrate safety into both the initial construction of the building as well as post-construction maintenance[7]. Some examples of incorporating fall protection into the design of the building include incorporating permanent anchor points or lifelines into the construction of the building as well as having window sills between 39 – 45 inches high, and using prefabricated building components. Building designers should also discuss the hazards that they were unable to eliminate with the general contractor so they can plan to address how to minimize these hazards[7].

When organizing the operational plan, the general contractor should identify the potential fall hazards associated with the project and plan on how to minimize or eliminate these hazards. Some ways to eliminate and minimize fall hazards include the use of safe and approved aerial platforms, ensuring that elevators are inspected and available to workers to move materials, and utilizing building material hoists. Contractors should also plan for interior finish work to be completed after elevators have been inspected and are available for use.

<u>Recommendation 5</u>: Designate a competent person or persons located on site to be responsible for developing, training, monitoring, and enforcing site-specific safety plans.

Discussion:

The general contractor and several subcontractors were responsible for the safe construction of this building. Every contractor and subcontractor is responsible for having an APP that addresses potential hazards they face on the jobsite. When there are fall hazards present, a fall protection work plan is also required. By having designated competent persons responsible for creating, educating and enforcing the site-specific safety plans, it helps ensure that all workers at the site have been trained on the safety plans. Designated competent persons would be responsible for:

- Developing a site specific accident prevention plan (APP).
- Developing a fall prevention work plan (FPWP) as part of the safety plan for sites that have fall hazards. Ensuring that the FPWP meets all state requirements. Washington FPWP Requirements.
- Training employees and contractors on the site specific APP and FPWP.
- Reviewing the specific job hazards each contractor faces and the plans for eliminating or minimizing these hazards. Orienting new contractors and employees as they arrive to the site.
- Controlling the access to the removal of guardrails or other fall hazard protections.
- Ensuring that in situations where a guardrail or other fall protection system is being removed that the worker has a separate fall arrest system established.
- Daily safety meetings with all subcontractors and employees in which the safety hazards are addressed and reviewed. This can be done by reviewing hazard identification checklists like the Construction Safety Checklist.
- Maintaining safety plans onsite
- When working conditions change, ensure that new hazards are identified along with solutions to eliminate or minimize these hazards.
- Ensuring the documentation of changes to safety plans and that employees and contractors are trained on the changes.
- Promoting a positive safety culture.

In Washington State, it is recommended that on worksites where fall hazards exist that a competent person develop the fall prevention work plan, provide the training for the fall prevention work plan, and be responsible for monitoring and enforcing it. A competent person is defined as “an individual knowledgeable of fall protection equipment, including the manufacturer’s recommendations and instructions for the

proper use, inspection, and maintenance; and who is capable of identifying existing and potential fall hazards and who is knowledgeable of the rules contained regarding the erection, use, inspection, and maintenance of fall protection equipment and systems. A competent person must have the authority to take prompt corrective action to eliminate fall hazards" (WAC 296-155-24503)[8]. If the person who is deemed the competent person is knowledgeable and able to recognize hazards but depends on someone else, such as the site foreman, to address hazards then they are not a competent person. Employers can use a Fall Restraint and Fall Arrest Competent Person Evaluation Checklist to help determine if an employee is deemed competent.

Like many construction projects, there were several subcontractors on this site. All subcontractors are responsible for recognizing and controlling hazards but it did not appear that there was a competent person or persons responsible for making sure that all workers on site were trained on site and task-specific safety. A competent person or persons should have been responsible for ensuring that all workers were aware of the hazards and that the proper precautions were taken to minimize them. For example, if the victim had been informed or reminded of the fall hazard and that he was required to use an appropriate fall restraint system before having the guardrail removed, this incident could have been prevented.

The promotion of a positive safety culture on the worksite by designated safety people and employers can influence the actions of others on the site. If safety is promoted as a priority, workers may be less likely to take safety risks. Therefore, it is important to reinforce that safety is the most important aspect of a worker's job[7].

ACKNOWLEDGEMENTS:

This report was reviewed by stakeholders from labor and business communicates and various Washington State and Federal worker safety agencies. Though we are unable to acknowledge specific individuals for their contributions to this report, we would like to recognize the following for their help and support of the FACE mission and objectives:

- The Employer's representative involved in the incident
- Division of Occupation Safety and Health (DOSH) Compliance Operations
- Division of Occupation Safety and Health (DOSH) Enforcement
- Federal FACE Program Management (NIOSH)
- Safety & Health Assessment & Research for Prevention (SHARP)
- Washington State Attorney General's Office

APPENDIX A:

Photo 1: Three-sided skip box used to elevate carpet rolls to window

Photo 2: Telehandler used to raise the skip box

Photo 3: Incident site showing window opening from which victim fell

Photo 4: Close-up of window victim fell from

Photo 5: View of window opening from inside building with arrows pointing to brackets that held up guardrail

Photo 6: Examples of fall hazard warning signs

Photo 7: Example of scaffolding platform

Photo 8: Picture of rug ram on a forklift

Appendix B:

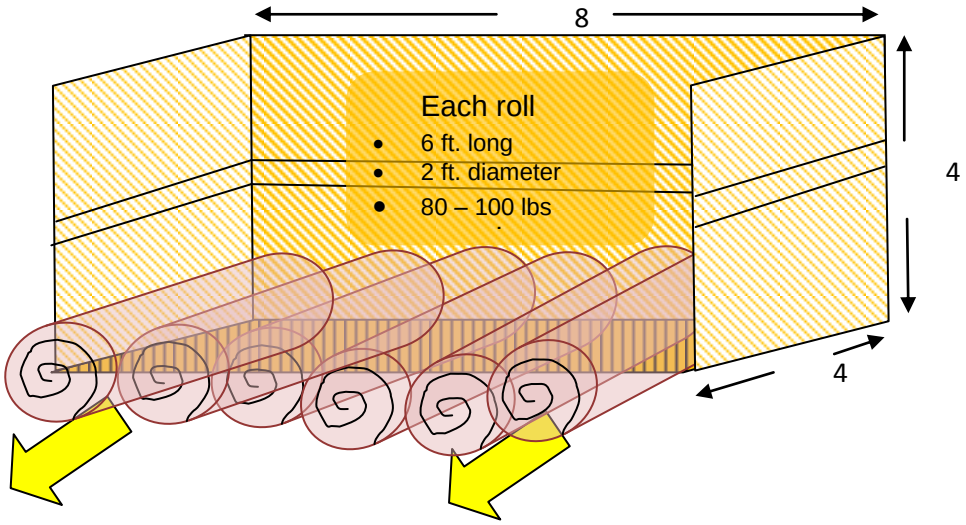

Figure 1: Diagram of the carpet rolls loaded lying down in skip box

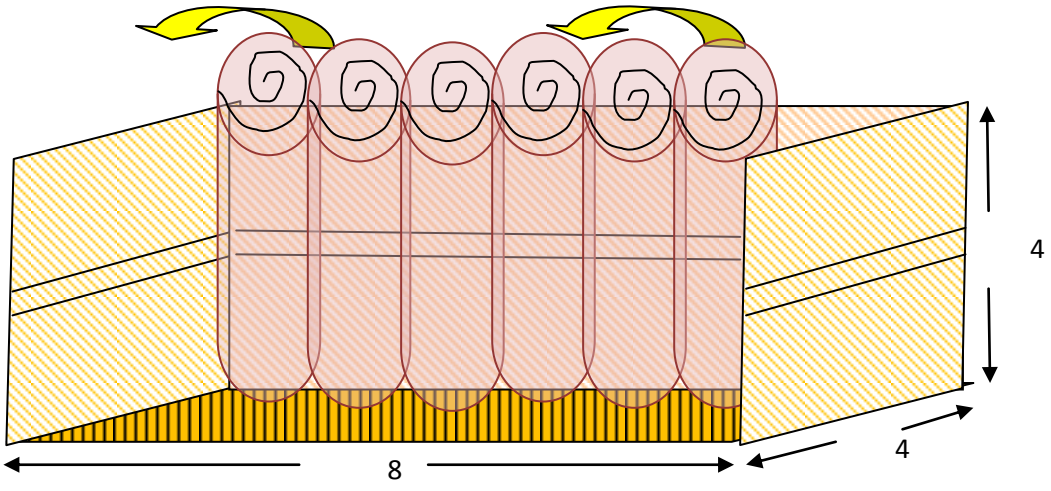

Figure 2: Diagram of the recommended way to load carpet rolls into skip box

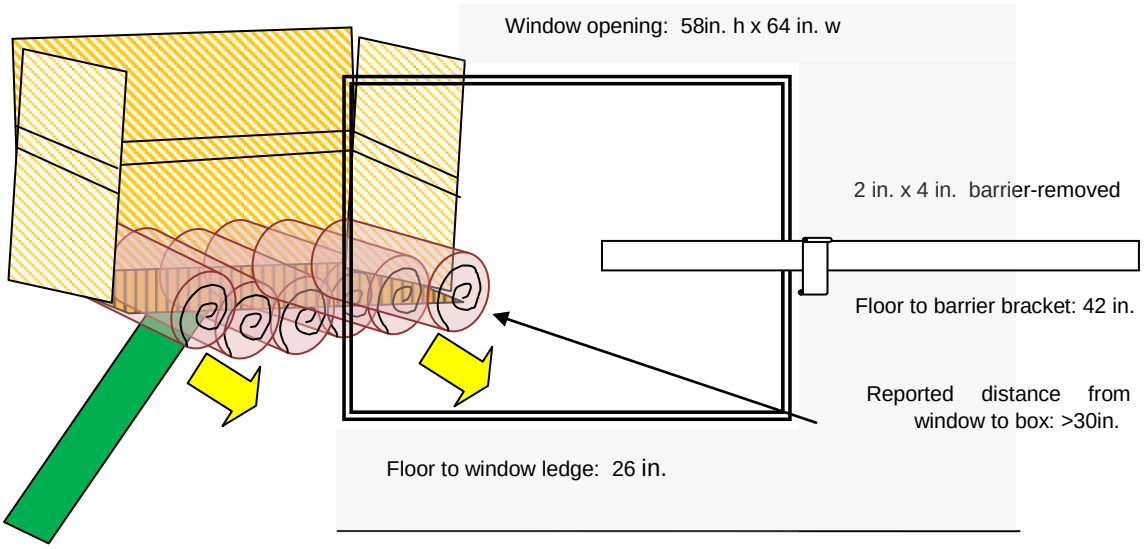

Figure 3: Diagram of the view from inside window when unloading the carpet rolls

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INVESTIGATOR INFORMATION

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Washington State FACE Program Information

The Washington State Fatality Assessment and Control (WA FACE) program is one of many workplace health and safety programs administered by the Washington State Department of Labor & Industries' Safety & Health & Research for Prevention (SHARP) program. It is a research program designed to identify and study fatal occupational injuries. Under a cooperative agreement with the National Institute for Occupational Safety and Health (NIOSH), WA FACE collects information on occupational fatalities in WA State and targets specific types of fatalities for evaluation. WA FACE investigators evaluate information from multiple sources. Findings are summarized in narrative reports that include recommendations for preventing similar events in the future. These recommendations are distributed to employers, workers, and other organizations interested in promoting workplace safety. NIOSH-funded, state-based FACE programs include: California, Iowa, Kentucky, Massachusetts, Michigan, New Jersey, New York, Oregon, and Washington. WA FACE does not determine fault or legal liability associated with a fatal incident. Names of employers, victims and/or witnesses are not included in written investigative reports or other databases to protect the confidentiality of those who voluntarily participate in the program.

Additional information regarding the WA FACE program can be obtained from:

Washington State FACE Program
www.lni.wa.gov/Safety/Research/FACE/default.asp
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