

DATE: December 29, 1995

FROM: Minnesota Fatality Assessment and Control Evaluation (MN FACE)
Program Minnesota Department of Health

SUBJECT: MN FACE Investigation 95MN05501
Window Washer Dies After Falling 35 Feet When Suspension Scaffold
Collapsed

SUMMARY

A 37-year-old window washer died of injuries sustained when the two-point suspension scaffold he was working from collapsed. The victim was not wearing fall protection and he fell thirty-five feet to the ground.

The window washing company the victim worked for was contracted to wash the windows of a six story building. Prior to his fall, the victim was operating a two-point suspension scaffold and washing windows on the third story of the building. The victim was working with one other coworker, who was also washing windows from the scaffold, at the time the incident occurred. The two workers arrived at the site shortly after 5:00 a.m. on the morning of the incident and set up the scaffold. It was dark at this hour of the morning and the victims did not use any type of artificial light to set up the scaffold. Each of the two outriggers was to be secured to a separate steel bar in order to attach counterweights to the outriggers. The steel bar was properly pushed through one of the outriggers with two counter weights attached to each side. In the darkness, the victims may not have been able to see the hole in the other outrigger. The steel bar was pushed through the counter weights on each side of the outrigger, but it was not pushed through the hole in the outrigger itself. The outrigger was positioned underneath the steel bar and therefore was not properly secured. Although the steel bar was not properly secured, the weight of the bar and only counter weights was enough to hold the outrigger in place for some time, and the victims were able to complete part of the job before the scaffolding collapsed. Emergency medical personnel arrived at the incident site shortly after being called, but the victim was pronounced dead on the way to the hospital. MN FACE investigators concluded that to reduce the likelihood of similar occurrences, the following guidelines should be followed:

- persons working at elevation should wear personal fall protection equipment
- tiebacks should be securely fastened to outrigger beams

- counterweights used with outriggers, should be sufficient to balance four times the intended load and securely fastened to outrigger beams
- adequate lighting should be used whenever assembling equipment
- employers should design, develop, and implement a comprehensive safety program
- persons working from elevated work surfaces should be trained in the recognition of fall hazards

INTRODUCTION

On October 3, 1995, MN FACE investigators were notified of a work-related fatality that occurred on October 3, 1995. The police department was contacted and releasable information obtained. Information obtained included a copy of their report of the incident. OSHA was contacted and releasable information was obtained. A site investigation was conducted by MN FACE investigators on November 10, 1995.

The employer in this incident was a window washing company set up as a partnership.

INVESTIGATION

On the morning of the incident, the victim operated a two-point suspension scaffold while washing the windows of six story building. The workers had cleaned the windows of this building in the past, however it was their first day on this job site in recent months. The swing stage scaffold set-up was comprised of a suspension system supported by outriggers placed on the roof of the building. Each outrigger was a 14.5 foot telescoping steel beam that extended sixteen inches beyond the edge of the building. The width of the outer beam was 3.5 inches, the width of the inner beam was 3.0 inches. The scaffold was suspended by wire ropes attached to the ends of the outriggers that extended beyond the edge of the building. Counterweight systems were attached to the other end of the outriggers to ensure that the outriggers remained on the roof of the building. The counterweight systems consisted of two steel bars pushed through each of two sets of counterweights and the two outriggers.

In this incident the steel bar used to connect two counterweights to each side of the two outriggers was properly pushed through the hole in one of the outriggers. On the other outrigger the steel bar was pushed through the counterweights on each side of the outrigger, but it was not pushed through the hole in the outrigger itself. The outrigger was positioned underneath the steel bar and therefore was not properly secured (Figure 1 and Figure 3). According to the formula that the Minnesota Occupational Health and Safety Administration uses for determining the appropriate number of fifty pound counterweights to use, neither outrigger was set up with an adequate amount of counterweight.¹ Minnesota OSHA requires that a safety factor of four be used when calculating the appropriate amount of counterweight. According to the formula, eight fifty pound counterweights should have been attached to each side of each outrigger (Figure 2). In this incident a safety factor of two existed with four fifty pound counterweights on each outrigger.

The window washing company the victim worked for was contracted to wash the windows of a six story office building. The window washing company rented part of the scaffold set up from a local scaffold rental company and they owned part of the set up themselves. The workers always rented the same type of scaffold equipment as was used on the day of the incident. The two workers arrived at the site shortly after 5:00 a.m. on the morning of the incident and set up the scaffold. It was dark at this hour of the morning and they did not use any type of artificial light while they set up the scaffold. In the darkness, the victims may not have been able to see the hole in the outrigger while they were attempting to push the steel bar through it. After setting the scaffold up on the roof of the building, the workers rode the building's internal elevator down to the ground floor. The workers got on the motorized scaffold at the ground floor and rode it up to the top story of the building where they started to wash the windows. It is customary to start washing windows at the top of the building so water isn't dripped on newly cleaned windows.

While the workers were cleaning the windows on the higher stories of the building, they heard a

¹
$$P = \frac{H * O * 4}{L}$$

H = Hoist Lifting Capacity (not intended load)

P = Counterweight needed (must have 4:1 safety ratio)

L = Length from fulcrum point to counterweight attachment point.

O = Overhang Length

Personal communication with Dave Miller at Minnesota OSHA

loud banging sound described by the surviving coworker as metal banging against metal. The banging sound was probably the outrigger banging against the steel bar as the scaffold was lowered down the building. The workers decided to wait until they had finished that section of windows before going to investigate the noise. They were able to complete the washing of three stories of one section of windows before the scaffold collapsed. The victim and his coworker were not equipped with any fall protection equipment.

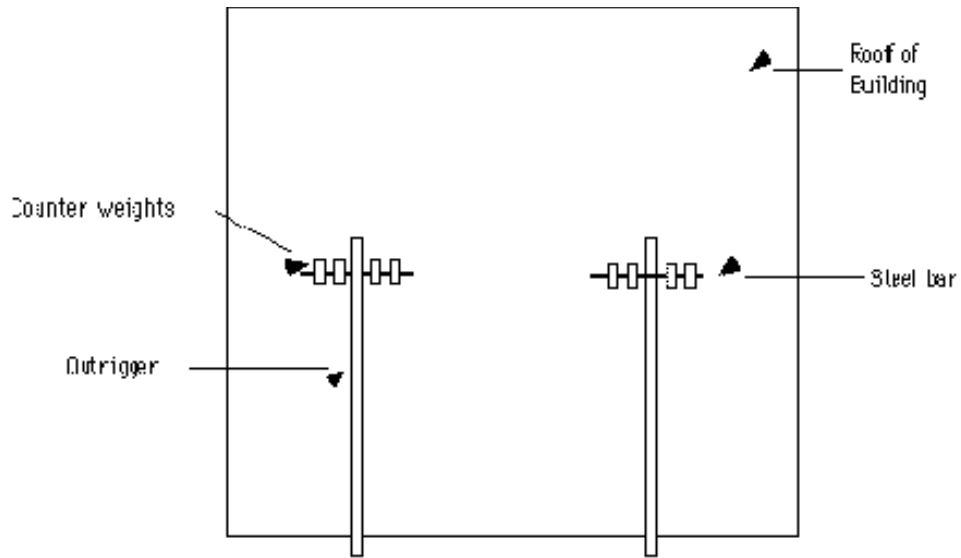


Figure 1.* Top View Of Building
Set Up Incorrectly

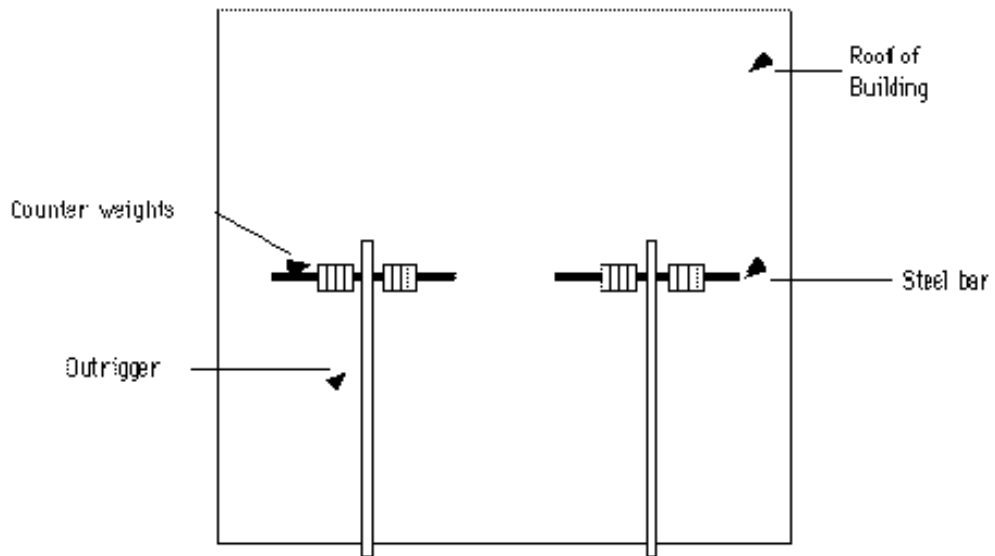


Figure 2.* Top View Of Building
Set Up Correctly

* Not Drawn to Scale

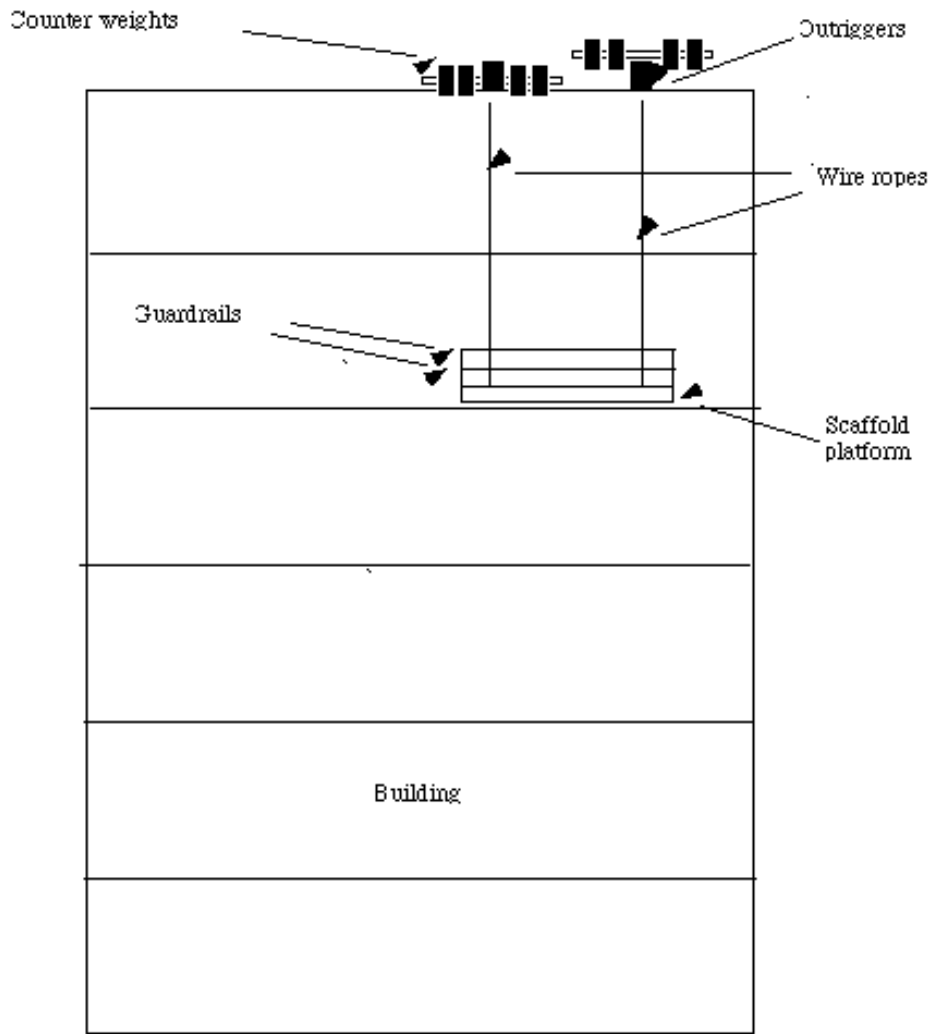


Figure 3
Side View of Building *

* Not Drawn to Scale

Although the steel bar was not pushed through one of the outriggers, the weight of the bar pushed through the counter weights and placed on top of the outrigger temporarily kept it from falling. While the scaffold was being pulled up, an even pressure was applied that kept the outrigger in place. After the workers completed washing a section of windows on one story of the building, they would lower the scaffold to the next story. Each time the scaffold was lowered it would stop abruptly, gradually displacing the outrigger from underneath the bar and counterweights. When they reached the third story, the scaffold collapsed and both workers fell to the ground. Two employees who were arriving to work at the office building discovered the workers and called 911. Emergency medical personnel arrived at the incident site shortly after being called. One of the workers was conscious when he was discovered but died from severe head trauma on the way to the hospital. The other worker was hospitalized with a broken bone in his back, a broken femur and hip and the possibility of vision loss in his right eye due to laceration

CAUSE OF DEATH

The cause of death listed on the death certificate was severe head trauma.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Persons working at elevation should wear personal fall protection equipment.

Discussion: The use of a safety harness/independent lifeline combination is required by 29 CFR 1910.28 (g) (9) for use on two-point suspension scaffolds. The use of the safety harness/independent lifeline with a rope grab device is appropriate for persons working from scaffolds at varying heights. The lifeline should be securely attached to substantial members of the structure (not scaffold), or to securely rigged lines, which will safely suspend the employee in case of a fall. Properly used, this type of fall protection would have prevented the workers in this incident from falling even when the scaffolding fell.

Recommendation #2: Tiebacks should be securely fastened to outrigger beams.

Discussion: When a suspension scaffold is supported by outrigger beams, tiebacks that meet the requirements of Code of Federal Regulations, title 29, section 1926.451(i) (4) should be securely fastened to the outrigger beam. The requirements of this code state that tiebacks of 3/4 -inch

manilla rope, or the equivalent, should serve as a secondary means of anchorage, installed at right angles to the face of the building, whenever possible, and secured to a structurally sound portion of the building. If the outriggers used with the scaffold involved in this incident had been securely tied back to the building, the scaffold probable would not have fallen. This recommendation is in accordance with Minnesota Rules 5205.0065 (C).

Recommendation #3: Counterweights used with outriggers, should be sufficient to balance four times the intended load and securely fastened to the outrigger beam.

Discussion: When counterweights are used with outriggers supporting a suspension scaffold, counterweights should be sufficient to balance four times the intended load. Counterweights should be securely fastened to the outriggers with the steel bar pushed through the hole in the counterweights as well as through the hole in the outrigger. This recommendation is in accordance with Minnesota Rules 5205,0065 (2) (D).

Recommendation 4: Adequate lighting should be used whenever assembling equipment.

Discussion: If the workers had used adequate lighting while setting up the scaffold, they may have seen the hole in the outrigger that the steel bar should have been pushed through when they attempted to secure the counter weights to the outrigger. If the counterweights had been adequately secured to the outrigger, this fatality may have been prevented.

Recommendation #5: Employers should design, develop, and implement a comprehensive safety program.

Discussion: Employers should ensure that all employees are trained to recognize and avoid hazardous work conditions. A comprehensive safety program should address all aspects of safety related to specific tasks that employees are required perform. OSHA Standard 1926.21(b)(2) requires employers to “instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury.” Safety rules, regulations, and procedures should include the recognition and elimination of hazards associated with tasks performed by employees.

Recommendation #6: Persons working from elevated work surfaces should be trained in the recognition of fall hazards.

Discussion: Workers should be educated as to the potential dangers that could result from a fall from elevation. Workers who understand the consequences that may result from this type of fall may be more careful when setting up scaffolds than workers who do not understand this type of danger.

REFERENCES

1. Office of the Federal Register: Code of Federal Regulations, Labor, 29 CFR Part 1910.28 (g) (9), U.S. Department of Labor, Occupational Safety and Health Administration, Washington, D.C. , July 1, 1994.
2. Office of the Federal Register: Code of Federal Regulations, Labor, 29 CFR Part 1926.21 (b) (2), U.S. Department of Labor, Occupational Safety and Health Administration, Washington, D.C., July 1, 1993.
3. Minnesota Labor and Industry, Occupational Safety and Health Standards, Chapters 5205,5206,5207,5210, 5215, Extract from 1993 Minnesota Rules, 5205.0065 (2) (C). St. Paul, Minnesota.
4. Office of the Federal Register: Code of Federal Regulations, Labor, 29 CFR Part 1926.451 (i) (4), U.S. Department of Labor, Occupational Safety and Health Administration, Washington, D.C., July 1, 1993.
5. Minnesota Labor and Industry, Occupational Safety and Health Standards, Chapters 5205,5206,5207,5210, 5215, Extract from 1993 Minnesota Rules, 5205.0065 (2) (D). St. Paul, Minnesota.