MIFACE INVESTIGATION #05MI163

SUBJECT: Construction Laborer Dies After Falling from Ladder

Summary: On September 5, 2005, a 27-year-old male construction laborer died after falling approximately 10 feet from a ladder and landing on a gatepost. The decedent was removing aluminum siding while standing on an aluminum ladder on the west side of a house he and his two coworkers were remodeling. The ladder was positioned over a cyclone gate and fence of a neighboring home. It appears that while he was removing the siding, he lost his balance and fell (Figure 1). One of his coworkers, who was carrying debris to the dumpster on east side of the home, heard the decedent moan. He returned to the decedent's work location and found the decedent's midsection folded over the gate. The decedent's head and legs were not touching the ground. His midsection was lying across the end cap of the gate, which was about two inches higher than the gate's top bar. He was also lying across a small nut and bolt, which was about one inch above the top bar. The ladder the decedent was working from was standing against the house, still positioned over the gate. The decedent rolled off the gate and landed on the ground. The decedent told his coworker to call 911. His coworker panicked and began to yell for help. A neighbor heard the calls for help and called 911. Passersby provided emergency first aid until emergency response arrived. The victim was transported to a local hospital where he was declared dead.

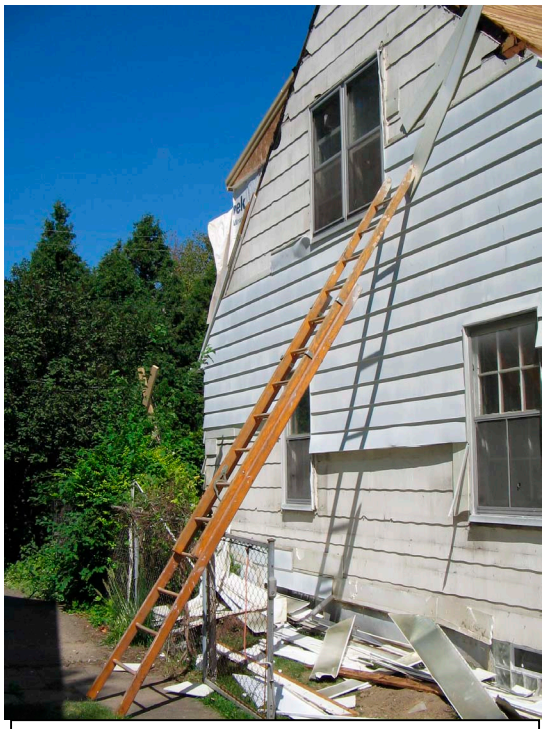

Figure 1. Siding being removed, ladder propped against fence

RECOMMENDATIONS

- Construction employers should consider using scaffolds or other work platforms to work from instead of ladders.
- Employers should be familiar with safe ladder use and train their employees to follow safe ladder use procedures.
- Employers should ensure that at least one person on the jobsite is certified in First Aid/CPR, should strongly consider having an individual certified as a Medical First Responder or Emergency Medical Technician (EMT), and hold at least semi-annual workplace rescue/first aid practices.
- Homeowners should inquire whether their potential building/remodeling contractors are licensed to perform the contracted work and licensed builders should offer to present their pocket card with their license number.

Key Words: Construction, Fall, Ladder

INTRODUCTION

On Wednesday, September 5, 2005, a 27-year-old construction laborer died after falling approximately 10 feet from a ladder and landing on a gatepost. MIFACE personnel were notified of this incident by an Internet blog, and then confirmed that the death was work-related when the death certificate was received. August 14, 2006, the MIFACE researcher interviewed the decedent's parents and a nurse and her husband who provided first aid to the decedent directly after his fall. The decedent's father accompanied the MIFACE researcher to the incident site where the owner of the home next door to the incident site had called 911 and the neighbor's ex-husband assisted in first aid activities after the injury. MIFACE was unable to contact the decedent's employer and another company owner who were on site at the time of the incident. During the course of writing this report, MIFACE reviewed the death certificate, the medical examiner report, the police report and pictures, and the MIOSHA citations. MIFACE also conducted a phone interview with the responding police department's detective assigned to the case. All photographs used in this report are courtesy of the responding police department.

Three individuals were on-site the day of the incident: the decedent, the decedent's employer, and another worker (Worker #1). The decedent's parents gave the MIFACE researcher copies of the business cards of the individuals who were working with the decedent that day. The decedent's employer stated on his business card that he was a "builder/contractor." The business card of Worker #1 stated "building and design, specializing in investment properties" and that he was "licensed and insured." MIFACE contacted the State of Michigan Builders Licensing Unit to verify the parents' statement that the individuals were not licensed to perform the renovation work. MIFACE found that neither individual was licensed as a residential builder in the State of Michigan. Worker #1 had taken and passed a real estate exam for real estate licensure in 2004, but did not apply for his real estate license.

The decedent's parents stated that the decedent had been working on site for approximately one week. The decedent loved working with wood and had worked for other construction firms, including the business owned by Worker #1. He was experienced in construction activities. The owner of the home being renovated contracted the decedent's to perform the renovation work to prepare the home for sale. It is unknown if the decedent's employer had a health and safety program or if the decedent's employer had provided health and safety training for the decedent.

MIOSHA issued the following Serious and Other-than-Serious citations to the employer:

SERIOUS: FIXED AND PORTABLE LADDERS – PART 11, RULE 1112(1).
The employer shall provide a training program for each employee who uses a ladder. The program shall enable each employee to recognize hazards related to the ladder and shall train each employee in the procedures to be followed to minimize these hazards.

Employees using portable extension ladders to remove aluminum siding from the exterior of the house have not been provided with ladder training that would enable employees to identify the proper construction and correct procedures for use and placement of ladders.

SERIOUS: FIXED AND PORTABLE LADDERS – PART 11, RULE 1122(5).
An employee on a ladder shall not overreach, or do any pushing or pulling that may cause the ladder to move or topple. If both shoulders are outside of a side rail, the user is overreaching.

Employees are using manual force to pull aluminum siding from the exterior of the house. The employees are working from portable extension ladders during this activity.

SERIOUS: FIXED AND PORTABLE LADDERS – PART 11, RULE 1124(1).
A portable ladder shall be used at such a pitch that the horizontal projected distance from the top support to the base is not more than ¼ the vertical distance between these points.

Employee is using a portable extension ladder set at a 57-degree angle to remove aluminum siding from the west side of the house. The top of the ladder is approximately 13 feet above the ground and the feet of the ladder are approximately 8 feet 9 inches from the wall of the house that the ladder is set against.

SERIOUS: FIXED AND PORTABLE LADDERS – PART 11, RULE 1124(2).
A portable ladder in use shall be equipped with appropriate safety feet, unless the ladder is tied, blocked, or otherwise secured to prevent it from being displaced. Slip-resistant feet shall not be used as a substitute for care in placing, lashing, or holding a ladder that is used upon slippery surfaces, including flat metal or concrete surfaces that are constructed so that they cannot be prevented from becoming slippery.

The portable extension ladder that an employee is using to remove aluminum siding from the west side of the house does not have safety feet and is not tied, blocked, or otherwise secured to prevent it from being displaced.

OTHER-THAN-SERIOUS: ADMIN RULE 2139, RECORDING & REPORTING OF OCCUPATIONAL INJURIES & ILLNESSES, RULE 1139(1).
Report orally, work-related fatalities or hospitalization of 3 or more employees as described in Rule 408.2110 within 8 hours to the Michigan Department of Labor and Economic Growth, Michigan Occupational Safety and Health Administration.

Employer did not notify the Michigan Occupational Safety and Health Administration of fatal injury to an employee within the 8-hour time limit.

INVESTIGATION

The following description of events is based upon the responding police detective's interview, responding police report, an interview with the decedent's family, and the neighbors who provided initial first aid.

The decedent, the decedent's employer, and the other construction company owner were working at the site on the day of the incident. The construction involved remodeling a vacant home, both inside and outside the home. The most recent project was the addition of a dormer. The framing of the dormer was completed, and the next step was to attach the fascia on the home. To attach the fascia the existing aluminum siding had to be removed.

The crew arrived early at the worksite, worked all morning, and had just finished lunch. The siding on the west wall within reach of ground level had been removed and dropped on the ground next to the home. To begin the siding removal from near the roofline, the decedent and one of his coworkers placed their ladders against the west wall. The decedent's ladder was positioned south of the dormer window. The other contractor's ladder was one section of an extension ladder and was placed south of the decedent's ladder. The decedent was wearing his tool belt. The decedent and his coworker removed several pieces of siding near the roofline prior to the incident.

Figure 2. Ladder without safety feet on driveway against fence/gate

When police first arrived, there were two ladders positioned against the west side of the house. Remnant debris was on the ground at the base of the ladder. A large section of aluminum siding was hanging loose on the house. Either the decedent's employer or the other construction company owner at some point took down both ladders during the emergency response activities. Either the decedent's employer or the other construction company owner repositioned the decedent's ladder; the patrol officer stated to the department detective that the replacement location of the ladder accurately represented the ladder location when he arrived. The second ladder was not replaced.

The ladder the decedent was working from was positioned over a cyclone gate and fence of a neighboring home. The ladder was resting on the one of the two concrete driveway tire tracks. The ladder was not secured or blocked in any way to increase ladder stability and did not have safety feet (Figure 2). A flexible "bungee cord" was hanging from the gate; the reason for its presence is unknown.

It is unknown how high on the ladder the decedent was standing. He was 6'1" tall, so it is hypothesized that he was not standing on the top three rungs of the ladder to reach above to strip the siding. The police detective stated that the hammer (Figure 3, arrow) was used by the decedent to assist him in removing the siding. The box in Figure 3 shows a divet in the ground caused by either the gate movement from the fall or the decedent/coworker "bracing" the gate by moving it toward the home they were working on.

Figure 3. Hammer used to remove siding

The event was unwitnessed. Several possible event scenarios have been developed; in each scenario the decedent was facing the home while standing on the ladder.

- As he was pulling the siding from the home, he may have also been rotating his body from his left to his right. As he pulled away the siding, he lost his balance, and the rotation of his body caused him to land on his midsection over the gate/gatepost.
- As he pulled away the siding, the force exerted by his movement from left to right may have caused the right side of the ladder to press against the movable gate. The gate flexed/moved and may have caused the ladder to shift/move. The ladder movement may have caused him to lose his balance and fall. As he fell, the momentum of his turning body caused him to land on his midsection on the gate/gatepost.

Figure 4. Gate configuration

The decedent fell approximately 10 feet. The police report states that the decedent fell approximately 15 feet. MIFACE determined that based on the extended ladder length, the height of the decedent, and his hypothesized location on the ladder, a fall of approximately 10 feet is more likely. When he fell, one of his coworkers was walking with debris to a dumpster located on the driveway on the east side of the home. He heard the decedent moan. He returned to the decedent's work location and found the decedent's midsection folded over the gate. He was positioned next to the ladder. The decedent's head and legs were not

touching the ground. His midsection was lying across the end cap of the gate, which was about two inches higher than the gate's top bar and across a small nut and bolt, which was about one inch above the top bar (Figure 4). The decedent rolled off the gate and landed on the ground.

The before the decedent lost consciousness, he told his coworker to call 911. According to the police report, the coworker stated he called 911. The neighbor who lived next door to the east of the home being remodeled and her ex-husband stated he panicked and began to yell for help and for someone to call 911. This neighbor stated she heard the calls for help and she called 911. A nurse and the nurse's husband were taking a walk with their child. The nurse's husband stayed with their child and the nurse and the ex-husband of the eastside neighbor applied initial first aid and heart compressions until the ambulance arrived. Emergency response stabilized the decedent and transported him to a local hospital where he was declared dead.

CAUSE OF DEATH

The cause of death as stated on the death certificate was blunt force abdominal trauma. No autopsy was performed. The results of the toxicology tests were negative for alcohol and other screened drugs.

RECOMMENDATIONS/DISCUSSION

- Construction employers should consider using scaffolds or other work platforms to work from instead of ladders.

Better work platforms for this construction activity would have been a scaffold or an aerial work platform. Many safety experts recommend that a ladder should be used primarily to climb to or from a work area, not as a work platform. Employers should endeavor to limit the use of a ladder as a work platform. The use of a ladder inherently limits the possible work area of a worker to an arm's length on either side of the ladder. Safe ladder use requires a worker to maintain a three-point connection (two hands/one foot or two feet/one hand) and his/her shoulders within the side rails. The employer should determine if there are safer alternatives to performing a job rather than using ladders.

When possible, instead of using ladders to work from, use scaffolds or an aerial work platform, such as a scissor lift. A larger work area, more stable work platform, and reduced physical stress could be gained through the use of scaffolding or other types of work platforms. This would enable a worker to walk small distances safely and reduce the need for re-positioning a ladder to access a new work area during operations. Because a worker can stand fully upright and use both hands for work procedures, an additional safety factor is obtained with this type of equipment. Also, a larger work surface is available for the safer storage or positioning of tools and materials.

Operators of an aerial work platform must receive training for the specific aerial work platform he/she operates and receive an aerial work platform permit. The aerial work platform permit should indicate the type of aerial work platforms an operator has been trained on and is qualified to operate. The permit may be carried on either the operator or be available at the worksite.

Employers are also required to train each employee who performs work on a scaffold. Employee training must be performed by a person qualified in scaffold safety and enable the employee to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize the hazards. MIOSHA defines a qualified person as a person who, by possession of a recognized degree, certificate or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his or her ability to solve or resolve problems related to the subject matter, the work, or the project. If the employee is involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold, he/she must be trained by a competent person. MIOSHA defines competent person as a person who is experienced and capable of identifying an existing or potential hazard in surroundings, or under working conditions that are hazardous or dangerous to an employee and who has the authority and knowledge to take prompt corrective measures to eliminate the hazards.

- Employers should be familiar with safe ladder use and train their employees to follow safe ladder use procedures.

Reinforcement of safe ladder practices by means of an accident prevention plan and training would have addressed the following items.

1. The ladder was not placed at a safe angle. The best angle for ladder stability is about 75 degrees. Set up straight ladders using the 4 to 1 rule: 1 foot from the wall for every 4 feet of the ladder's working length. The extension ladder length could have been adjusted so that the ladder placement would have been 4:1. If ladders are set up at a steeper angle than 75 degrees above horizontal they are more likely to tip backward in use. If ladders are set up at an angle less than 75 degrees above horizontal they are more likely to slide out from the bottom.
2. The ladder used did not have safety feet nor was the ladder secured. Safety feet and securing a ladder provides stability by minimizing ladder movement. A ladder should always have four-point contact with the working surface, and pressure on each leg should be proportional. The force exerted by the decedent as he was removing the siding may have put a side load on the ladder.
3. It appears that the gate was being used to help support the ladder. The moveable gate was not secured against movement. The box in Figure 3 highlights a divet that the gatepost made in the grass. It is unknown whether the divet was due to gate movement at the time of the incident or whether the workers pulled the gate toward the home being remodeled prior to the incident in an attempt to "dig" the gate into the ground to minimize gate movement. When positioning ladders, it is important to ensure that all of the supporting structures are stable and strong enough to hold the weight that will be placed on them. Under no circumstances should ladders be supported by structures that may inadvertently cause movement of the ladder.

In addition to the MIOSHA Construction Safety Part 11 Fixed and Portable Ladder standard, there are many resources on the Internet concerning safe operating procedures for portable ladder use. Examples include:

- University of Nebraska – Lincoln. Internet Address: (http://ehs.unl.edu/sop/s-ladder.pdf),
- OSHA Construction e-Tool: Misuse of Portable Ladders. Internet Address: (www.osha.gov/SLTC/etools/construction/falls/ladders.html),
- Center to Protect Workers Rights Portable Ladder Safety Hazard Alert. Internet Address: (www.buildsafe.org/hazalerts/hazladders.pdf).

- Employers should ensure that at least one person on the jobsite is certified in First Aid/CPR, should strongly consider having an individual certified as a Medical First Responder or Emergency Medical Technician (EMT), and hold at least semi-annual workplace rescue/first aid practices.

Emergencies can and do happen, including personal injuries, sudden illnesses (such as a heart attack), fires, natural disasters (such as tornadoes and floods), and violent acts. Emergency situations require a designated person to be in charge of managing the emergency. This person ought not to be the First Aid/CPR or medical first responder, as his/her attention should be solely devoted to stabilizing the victim of an injury/illness situation.

The American Red Cross defines CPR/First Aid as recognizing and caring for breathing, cardiac, and life-threatening emergencies, such as severe bleeding and sudden illness. CPR/First Aid procedures provide assistance in knowing what action to take if an emergency does arise. One of the emergency issues that arise is that CPR/First Aid training does not address a "rescue" situation.

A certified medical first responder is a person who has completed forty to sixty hours of training in providing care for medical emergencies, such as an injury or illness that poses an immediate threat to a person's health or life that requires help from a doctor or hospital. A certified first responder has more skill than someone who is trained in First Aid/CPR, but a first responder is not an emergency medical technician (EMT).

There were two different accounts of the emergency response to this injury. The neighbor stated that the coworker was in a panic situation and did not call 911; she made the call. In the police report, the coworker stated he called 911. In either case, neither the employer nor the coworker (company owner) began emergency first aid or CPR. Fortunately for the decedent, a nurse and another knowledgeable neighbor were nearby to provide patient medical support. It is unknown if the two individuals working with the decedent were trained in First Aid/CPR; one would think that if either had training, they would have provided first aid.

The American Red Cross professional rescuer courses are designed for people with job-related duties in emergency preparedness and response, including industry response teams who must take action in emergency situations. The American Red Cross Emergency Response course is a comprehensive course designed for training first responders. The course follows the 1995 US Department of Transportation (DOT) First Responder National Standard Curriculum The

medical first responder course is also taught in many community colleges. MIFACE encourages employers to contact these providers to provide First Aid/CPR and medical responder training to their employees. To ensure readiness in the case of a serious workplace injury, the employer should hold at least semi-annual workplace rescue/first aid practices.

- Homeowners should inquire whether their potential building/remodeling contractors are licensed to perform the contracted work and licensed builders should offer to present their pocket card with their license number.

State of Michigan law requires that individuals and companies performing residential construction, or a combination residential/commercial construction totaling $600, or more in materials and labor must be licensed as either a residential builder or a maintenance or alteration contractor. A Maintenance & Alteration license indicates that the holder has met requirements for one or more of the following trades:

Basement Waterproofing	Painting, decorating	Excavation	Storms, screens
Concrete	Siding	House wrecking	Tile, marble
Gutters, downspouts	Swimming pools	Masonry	
Insulation	Carpentry	Roofing	

Individuals or companies providing services totaling less than $600 in materials and labor or who are functioning as a sub-contractor for a licensed contractor on a residential or combination residential/commercial construction project are exempt from licensure. Neither of the company owners had obtained a Michigan Residential Builders license which would have had State authorization to build a complete residential structure and to do maintenance & alteration (remodeling) work on a residential structure. Most likely, the remodeling work totaled more than $600, and therefore, both the companies should have been licensed.

MIFACE encourages homeowners to ensure that contracted residential builder have a residential builder's license or, depending upon the work performed, an alteration and maintenance license for the trade desired. To determine if the contractor is licensed the homeowner should contact the State of Michigan Builders Licensing Unit. Home builder/remodeler contractors show potential clients the pocket card indicating their licensure with the State of Michigan to promote the recognition that licensure provides.

RESOURCES

MIOSHA standards cited in this report may be found at and downloaded from the MIOSHA, Michigan Department of Labor and Economic Growth (DLEG) website at: www.michigan.gov/mioshastandards. MIOSHA standards are available for a fee by writing to: Michigan Department of Labor and Economic Growth, MIOSHA Standards Section, P.O. Box 30643, Lansing, Michigan 48909-8143 or calling (517) 322-1845.

- MIOSHA Construction Safety Standard, Part 11, Fixed and Portable Ladders.
- MIOSHA Construction Safety Standard, Part 12, Scaffolds and Scaffold Platforms.
- MIOSHA Construction Safety Standard, Part 32, Aerial Work Platforms.

- Miller, Barrett Med, OHST. *Safe Ladder Management*. Internet Address: www.safety-engineer.com/ladder.htm
- Electronic Library of Construction Occupational Safety and Health (eLCOSH). *Ladder Safety*. Internet Address: www.cdc.gov/eLCOSH/docs/d0100/d000170/d000170.html
- Male Farmer/Handyman Dies After Falling From an Unstable Ladder. Minnesota FACE Investigation 93MN00201. Internet Address: www.cdc.gov/niosh/face/stateface/mn/93mn002.html
- University of Nebraska – Lincoln. Safe Operating Procedures: Portable Ladder Safety. Internet Address: http://ehs.unl.edu/sop/s-ladder.pdf
- OSHA Construction e-Tool: Misuse of Portable Ladders. Internet Address: http://www.osha.gov/SLTC/etools/construction/falls/ladders.html
- Center to Protect Workers Rights (CPWR): Portable Ladder Safety Hazard Alert. Internet Address: http://www.buildsafe.org/hazalerts/hazladders.pdf
- American Red Cross. Preparing Professional Rescuers. Internet Address: http://www.redcross.org/services/hss/courses/professional.html

2/01/07

MIFACE
Investigation Report # 05 MI 163
Evaluation

To improve the quality of the MIFACE program and our investigation reports, we would like to ask you a few questions regarding this report.

Please rate the report using a scale of:

Excellent	**Good**	**Fair**	**Poor**
1	2	3	4

What was your general impression of this MIFACE investigation report?

Excellent	**Good**	**Fair**	**Poor**
1	2	3	4

Was the report…	**Excellent**	**Good**	**Fair**	**Poor**
Objective?	1	2	3	4
Clearly written?	1	2	3	4
Useful?	1	2	3	4

Were the recommendations …	**Excellent**	**Good**	**Fair**	**Poor**
Clearly written?	1	2	3	4
Practical?	1	2	3	4
Useful?	1	2	3	4

How will you use this report? (Check all that apply)

- ❑ Distribute to employees/family members
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- ❑ File for future reference
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Thank You!

Please Return To:

MIFACE
Michigan State University
117 West Fee Hall
East Lansing, MI 48824
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