

MIFACE Investigation Report: #13MI091

Subject: Painter Died When Elevated Scissor Lift Tipped to Side When Tire Entered Pavement Depression

SUMMARY

In the summer of 2013, a male painter in his 30s died when the tire of the elevated Skyjack 3220 scissor lift in which he was working entered a depression in a parking lot caused by a recessed storm drain and tipped to its side (Figure 1). The decedent and his coworker were elevated approximately 15 feet in the scissor lift while they painted a building's eaves/fascia. To protect the ground from paint overspray, the workers laid opaque plastic on the asphalt pavement. The plastic covered a storm drain grate, which was recessed 4½ inches. The workers noticed an area that had been missed during their painting work, so the lift had to be moved back to the



Figure 1. Incident site showing overturned scissor lift

missed area on the fascia. Both workers knew the storm drain grate was nearby but thought it was several feet away. While the lift was elevated, the decedent was in charge of operating the lift. While in the process of backing the lift to the missed area of fascia, the lift's left rear tire entered the 4½-inch storm drain depression, which was located approximately 20 feet away from the building causing the lift to tip to its side toward the building. The decedent's coworker jumped from the lift as it was falling and received non-fatal injuries. The decedent stayed in the lift basket and struck the ground, receiving head injuries. Emergency response was called and the decedent was transported to a local hospital where he died two days later from his head injuries.

Factors which contributed to this fatal incident include:

- Site hazard (drain and associated deteriorated surrounding pavement) was identified but corrective measures not undertaken
- Unmarked site hazard covered when pavement and drain were covered with plastic
- The lift was elevated when it entered the storm drain depression
- Spotter was not used while operating the elevated lift

RECOMMENDATIONS

- Assure work areas are inspected for hazards and take corrective actions to eliminate the identified hazards before and during operation of an aerial lift.
- Employers should ensure that workers who operate self-propelled elevated lifts are adequately instructed in how to perform their duties and trained to safely operate the lift. Training should include, but not be limited to: a) how to perform a work area inspection to identify and minimize identified hazards; b) how to operate the lift in an elevated position; c) how to perform a pre-shift inspection that includes a visual and operational check; and d) report to management when the lift does not pass a visual or operational check.
- Employers should maintain equipment in accordance with the manufacturer's recommendations.
- Employers should develop formal, written and specific equipment instructions to be used as training tool to ensure employees receive consistent training.
- Employers should, in addition to developing and implementing a health and safety program, develop mechanisms to ensure adherence to the health and safety program by both management and employees. One approach is ensuring the company's culture has safety as a core value.

Background

In the summer of 2013, a male painter in his 30s died when the tire of the elevated Skyjack 3220 scissor lift in which he was elevated entered a depression in a parking lot caused by a recessed storm drain and tipped to its side. MIFACE learned of this incident from the MIOSHA 24-hour ASAP reporting system. MIFACE contacted the safety director for the company, who agreed to speak with the MIFACE investigator about the incident as well as share pictures taken at the time of the incident. MIFACE also took incident scene pictures as part of the site visit. At a later date, MIFACE spoke with the decedent's widow about the incident. During the writing of this report, the death certificate, police and medical examiner reports, and the MIOSHA compliance file were reviewed. The picture used in Figure 1 is courtesy of the employer. The pictures used in Figures 2-5 are courtesy of the MIOSHA file. MIFACE removed any company/location identifiers from the pictures.

The employer performed commercial painting, power washing and sandblasting and had been in business for more than 30 years. The number of employees varied with time of year; seasonal employees were hired in the summer. The decedent was one of more than 90 painters employed at the non-union affiliated firm. The decedent had been employed previously by the firm as a painter. The decedent left the firm for approximately two years and worked various jobs during this time. The firm rehired him three months prior to the incident. He worked full time and was paid hourly.

The firm had a written accident prevention program as required by MIOSHA that had originally been developed by a consultant but modified over the years by firm personnel. The safety director managed the safety program as well as having various additional duties such as environmental compliance.

All new employees attend a new hire training orientation where both company personnel and safety policies were addressed. When the decedent was rehired, he was considered a new hire and received training on the company safety and health management system, safe work practices and expectations, and specific safety and health training for tasks that he was expected to perform. Safety training included, but was not limited to, personal protective equipment, fall protection, hazard communication, RCRA, scissor lift and boom lift training. The safety director conducted the training with each new hire and used a checklist to ensure all individuals received the same information. Individuals operating the lifts were required to successfully complete a “proof of knowledge” written test and demonstrate to the safety director and/or the field superintendent/foreman (who were delegated safety responsibilities in the field). The decedent had completed an aerial lift knowledge test.

The firm did not have a health and safety committee. Safety meetings were held with the employees on a weekly basis (tailgate talks) as well as monthly meetings where all employees came to the corporate office for training. Training was documented.

The safety director and the field superintendents/field crew foreman conducted unannounced safety audits of the worksites, typically daily, but the frequency depended on the complexity and length of the job. All field superintendents/field crew foremen had successfully completed an OSHA 30-hour course.

Firm Policy Remediation Following Incident

The firm has completed the following actions to address the root causes of the incident:

- The firm now requires the lowering of the lift prior to movement
- A formal job safety analysis (JSA) must be performed prior to every job using a pre-task card. Prior to the incident a formal JSA was performed for work performed inside of a facility, but not routinely for outside work. The pre-task card is a 4” by 8” card with boxes for hazard identification and spaces for mitigation strategies.
- Reimplementation of a former safety policy – monthly safety meetings are now held and attendance is mandatory for all employees.
- Reviewed and updated the new hire booklet.
- The firm implemented a stand down training event that is incident driven. When an injury occurred, the injury is now reviewed, causes discussed, and prevention strategies identified.

MIOSHA Construction Safety and Health Division issued the following alleged Serious citation at the conclusion of its investigation.

Serious: AERIAL WORK PLATFORMS, PART 32

- RULE 3208(3):

All unsafe items found as a result of the inspection of the aerial work platform or work area were not corrected before further use of the aerial work platform. ---

Employees engaged in painting activities.

A) The work area around the building had four waste water drains.

B) The aerial work platform was covered with paint, obscuring all controls and signage.

- RULE 3206(d):

All danger, caution, and control markings and operational plates were not legible or obscured on an aerial work platform. ---

The aerial work platform was covered with paint, obscuring all controls and signage.

Employees engaged in painting activities.

- RULE 3216(10):

Before and during driving while elevated, an operator of a platform did not look in the direction of, and keep a clear view of, the path of travel and make sure that the path was firm and level. ---

Employees exposed to a fall of approximately 15 feet, driving while elevated, in an aerial work platform. Employees engaged in painting activities.

Investigation

The company owned and maintained scissor style self propelled work platform (scissor lift) involved in the incident was a Skyjack 3220. The lift had been used during spray painting operations and the control box and other informational labels on the machine were covered with paint overspray making them illegible (Figure 2). The safety director indicated that platform controls operated the scissor lift as designed and there were no operational issues with the lift. It is unknown if the lift had tilt sensing equipment installed by the manufacturer.

The decedent and his coworker had been working at the incident site for several days. The jobsite had been visited daily by the safety director, the firm's vice president and/or the field supervisor/foreman because of its proximity to the home office. During these management visits, each side of the building had a wastewater storm drain and the locations of these storm drains were discussed with the decedent and his coworker, but neither management nor the work crew took corrective actions to highlight/mark each drain location. This painting contract was the decedent's first remote work since his re-hire.



Figure 2. Scissor lift involved in the incident

The incident site was a building with four concrete overhang points that extended approximately 25 feet away from the building. Under each overhang point was a round wastewater storm drain. The overhangs were approximately 16 feet in elevation at the building and approximately 21 feet in height at the tip of the point (Figures 3 and 5).



Figure 3. Example of building construction. Circle indicates drain location under tip of overhang

The pavement around the wastewater storm drain involved in the incident had deteriorated and the grate recessed into the asphalt approximately 4 ½ inches (Figure 4). The pavement sloped toward the drain to provide parking area drainage.

The decedent's wife mentioned that during the previous days, the decedent had ordered sandblasting equipment to prepare the surface for painting. This placed the painting activity a little behind schedule.

The safety director indicated that to work safely around the recessed drains while preparing the building for painting, the decedent's coworker would act as spotter and direct the decedent, who was operating the lift, to maneuver the lift around the storm drain in the area in which they were working.



Figure 4. Storm drain cover/pavement condition at incident

On the morning of the incident, a company representative arrived and dropped off some painter's plastic and paint. The decedent and his coworker placed the translucent plastic on the asphalt to protect

it from paint splatter while painting. The plastic also covered the storm drain grate. The decedent and his coworker did not mark the location of the grate and could not view the grate through the plastic (Figure 1). The decedent positioned the lift and elevated himself and his coworker approximately 15 feet to begin painting (Figures 3, 5). The workers were not required to be tied-off because the lift had guardrails which were compliant with MIOSHA regulations.

It was a calm day (no wind) and the temperature was approximately 55⁰F at the time of the incident. The workers noticed an area that had been missed during their painting work, so the lift had to be moved back to the missed area on the fascia. Both workers knew the storm drain grate was nearby but thought it was several feet away. While the lift was elevated, the decedent was in charge of the operating the lift. While in the process of backing the lift to the missed area of fascia, the lift's left rear tire entered the 4½-inch storm drain depression, which was located approximately 20 feet away from the building causing the lift to tip to its side toward the building. The decedent's coworker jumped free from the falling lift and sustained non-life-threatening injuries. The decedent fell with the lift to the asphalt and sustained serious head injuries. Emergency response was summoned and the decedent was transported to a local hospital where he died two days later from the injuries sustained.



Figure 5. Incident scene following equipment removal

Cause of Death

The cause of death as listed on the death certificate was traumatic brain injury from 15 foot fall from lift. An autopsy and associated toxicological tests were not performed.

Recommendations/Discussion

- Assure work areas are inspected for hazards and take corrective actions to eliminate the identified hazards before and during operation of an aerial lift.

An inspection of the work area is critical when operating a scissor lift due to the mechanical dynamics of an elevated scissor lift aerial working platform. Possible hazards to consider include but are not limited to drop-offs or holes, including those concealed by water, ice, mud, etc.; slope(s); bumps and floor obstructions; debris; overhead obstructions; high voltage conductors; inadequate surface and support to withstand all load forces imposed by the aerial platform in all operating configurations (including wind and weather conditions) or other unsafe conditions. When hazards are indentified, corrective actions should be taken to minimize the identified

hazards to permit safe operation of the scissor lift. If the hazards cannot be minimized, then another type of equipment should be utilized.

- Employers should ensure that workers who operate self-propelled elevated lifts are adequately instructed in how to perform their duties safely and are trained to safely operate the lift. Training should include, but not be limited to: a) how to perform a work area inspection to identify and minimize identified hazards; b) how to operate the lift in an elevated position; c) how to perform a pre-shift inspection that includes a visual and operational check; and d) report to management when the lift does not pass a visual or operational check..
- a) When elevated over its base of support, the work platform of a scissor lift creates a long lever arm; a small amount of sidewise or horizontal force on the raised platform can place enough force on the base to cause a tip-over. While in the elevated position the center of gravity was higher, allowing the lift to more easily topple when the wheels encountered the ground depression. Scissor lifts are designed to safely elevate on a flat, level surface, or within the manufacturer's surface grade specifications. Adding a sloped surface to other stability characteristics increases the effect of both leverage and platform load, making the lift unstable. A thorough work area inspection will identify ground and overhead hazards which should be mitigated prior to operation of the scissor lift.

The extent of training received by the decedent regarding work area hazard identification when operating a scissor lift is unknown. Also unknown is whether he had reviewed the scissor lift operating manual.

The operating manual contained the following safety precautions:

- Do not drive or elevate the aerial platform if it is not on firm level surfaces. Do not drive elevated near depressions or holes of any type, loading docks, debris, drop-offs and surfaces that may affect the stability of the aerial platform.
 - If operation in areas with holes or drop-offs is absolutely necessary, elevated driving shall not be allowed. Position the aerial platform horizontally only with the platform fully lowered. After ensuring that all four wheels or outriggers have contact with level firm surface, the aerial platform can be elevated. After elevation, the drive function must not be activated.
 - Elevated driving must only be done on a firm level surface.
- b) The storm drains and their associated deteriorating surrounding pavement had been identified as a work site hazard by management and discussed with the decedent. Management did not implement any engineering controls, such as covering the drain with material to withstand the weight/load of the scissor lift and/or barricading the drain. The corrective action to minimize the hazard posed by the storm drain depression taken by the decedent and his

coworker was the coworker acting as a spotter (administrative control) while the decedent operated the lift. When the crew laid the plastic, the storm drain, which was thought to be further away from their location, was obscured from view. The work crew did not have a clear view of the ground and without either engineering controls, the use of the spotter, or otherwise identifying the obscured storm grate location with a traffic cone or portable barrier, this incident occurred. Although a traffic cone placed over the drain or a portable barricade around the drain would not have stopped the lift movement, it could have served as a reminder about the location of the storm drain and minimized the likelihood of this incident occurring.

- c) The MIOSHA General Industry Standard, Part 32 – Aerial Work Platforms requires operators ensure that the lift has been properly maintained and inspected prior to use to identify conditions that could affect its safe use. The standard requires that the operator conduct a visual inspection by walking around the lift to ensure the lift is in good working order and check to ensure the platform floor, guardrails, tires and wheels are in good condition, that controls are clearly marked for function and safety signage intact and legible, and hydraulics are not leaking. Operators should also conduct a functional test to ensure ground controls, manual lowering control and platform controls including emergency stops, steering and drive functions are operating normally. Although not contributory to the incident, the lift and its safety and control signage was covered in paint.
- d) An “open door” policy regarding equipment status, safety issues, or other business issues is imperative for a safe workplace. The lift the decedent and his coworker were using was not in a safe operating condition. Worker training should encourage each employee to consult with their supervisor if they have a concern with equipment, safety, etc., without fear of management retaliation and/or job loss. An open door policy would encourage worker participation and “buy in” regarding safety. Additionally, management may not know of an issue, and an employee bringing their concern will enable management to learn of the issue and act on it. MIFACE encourages workers to bring safety issues to management for the safety of all company employees.
 - Employers should maintain equipment in accordance with the manufacturer’s recommendations.

The lift had been used during spray painting operations and the lift and control box were covered with paint overspray making the informational labels illegible and the indicator lights indiscernible. These conditions may not have had a direct impact on the incident; however, the general condition of the machine indicated a lack of appreciation for maintaining equipment in safe working condition. Employers should ensure that equipment receive regular preventative maintenance and service according to the manufacturer’s recommendations to ensure it is in good working condition.

- Employers should develop formal, written and specific equipment instructions to be used as training tool to ensure employees receive consistent training.

Although the decedent had attended the employer's new hire orientation (which included safety topics), had been trained on the scissor lift and had received a permit to operate the lift, the topics covered during the scissor lift training were unknown. The MIOSHA aerial lift standard has requirements for aerial lift operator training, but the consistency of the information given could be subject to change based upon the trainer. A checklist of information to be covered during specific equipment training would enable trainers to be consistent in information presented.

- Employers should, in addition to developing and implementing a health and safety program, develop mechanisms to ensure adherence to the health and safety program. One approach is ensuring the company's culture has safety as a core value.

Per the MIFACE interview with the safety director, the safety director and the field superintendents/field crew foreman conducted unannounced safety audits of the worksites, typically daily, but the frequency depended on the complexity and length of the job. All field superintendents/field crew foremen had successfully completed an OSHA 30-hour course. The safety director indicated that management personnel visited this work site on a daily basis due to its proximity to the company headquarters. The site hazard – the recessed storm drains around the building – had been identified by management and the work crew. On the day of the incident, neither management personnel nor the work crew initiated a corrective action to minimize the hazard, such as covering the drain, marking the drain in some way (such as a cone or sawhorse) or barricading the drain, or using a spotter.

There is a distinction between “safety as a priority” and “safety as a core value”. Priorities are competitive in nature and may change over time, but core values do not. Safety must be integrated as an intrinsic company value (not a priority) and embedded among every leader, manager, and employee in the organization.

Although the firm had a written Accident Prevention Program as required by MIOSHA Construction Safety Standard, Part 1, General Rules and had performed the required safety training, the tragedy still occurred. Management systems and their associated policies and procedures depend upon the actions of individuals for their successful implementation. The firm's safety program may reflect the desired intent, however the successful execution of the program requires each member of the firm to understand their role and the importance of the underlying intent, to accept their responsibility for the task, and to understand that taking a potentially unsafe shortcut would be, quite simply, wrong and not acceptable.

An effective safety program holds all employees (owners, supervisors/foreman, and employees) accountable for doing their jobs safely. In a strong safety culture, everyone feels responsible for safety and pursues it on a daily basis and going beyond the “call of duty” to identify unsafe conditions and behaviors and intervene to correct them. Likewise, co-workers routinely look out

for one another and point out unsafe actions and conditions to each other. Over time the norms and beliefs of the organization *shift focus from eliminating hazards to eliminating unsafe actions and building systems that proactively improve safety and health conditions*. Employee safety and doing something the right way takes precedence.

Key Words: Aerial platform, Scissor lift, Painting, Construction

REFERENCES

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

- MIOSHA Construction Safety Standard, Aerial Work Platforms, Part 32 http://www.michigan.gov/documents/lara/lara_miosha_CS_32_5-01-2013_419360_7.pdf
- Weather history for incident site: <http://www.wunderground.com/>
- California FACE Case Report: 09CA008: A Welder Dies When the Scissor Lift He was Operating Tips Over. <http://www.cdc.gov/niosh/face/stateface/ca/09ca008.html>
- 2480: Safe Operation of Scissor and Boom Lifts. <http://www.eri-safety.com/Documents/2480fs.pdf>
- Scissor Lift Safety & Operating Procedures. <http://www.a-m-c.ca/files/procedures/ScissorLiftTruckSafetyandOperatingProcedure.pdf>
- OSHA Fact Sheet: Aerial Lifts. <https://www.osha.gov/Publications/aerial-lifts-factsheet.pdf>
- OSHA Standard Interpretation “Subpart L and Appendices, Scissor Lifts”. https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=24191

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