



STATE OF NEW YORK DEPARTMENT OF HEALTH

FATALITY ASSESSMENT AND CONTROL EVALUATION

Master stonemason dies in a 30-foot fall from a handmade work platform attached to a powered industrial truck Case Report: 07NY107

SUMMARY

In October 2007, a 44 year-old self-employed master stone mason (the victim) died after falling approximately 30 feet to the ground from the upper tier of a handmade, wooden, two-tiered work platform. The victim was a subcontractor on the renovation project of a 19th century mansion that included the construction of a second story addition. At the time of the incident, the victim had been applying a stucco finish to the addition and painting metal trim at the edge of the roof from the upper tier of the platform. He was preparing to exit the platform onto the roof. The work platform, used for moving both materials and employees, had been fabricated by the victim and an employee of the general contractor (GC) two weeks prior to the incident. The platform had been fastened to the forks of a powered industrial truck (PIT) known as a telescopic handler. The front guardrails on the upper tier of the platform were not in place at the time the incident occurred. The victim was not wearing any type of fall protection as he worked near the unprotected front side of the upper tier. Safety procedures were not in place requiring entry/exit three-point contact (two hands and a foot or two feet and a hand) and 100% tie-off.

One other worker was on site on the day of the incident. He was an employee of the GC and the same employee who helped the victim build the two-tiered platform. At approximately 3:15PM, the victim asked the employee to lower the platform slightly. The employee stated that he went down to ground level and climbed into the cab of the telescopic handler, waiting for the victim to exit the platform and tell him when he should move the platform. He stated that he could not see what the victim was doing, since the boom of the machine was elevated and the platform blocked his view. He saw a paintbrush fall and then saw the victim fall, landing on the ground at the base of the addition. The victim was transported to a local hospital where he was pronounced dead from severe head and upper body injuries.

New York State Fatality Assessment and Control Evaluation (NY FACE) investigators concluded that to help prevent similar incidents from occurring in the future, employers and contractors (general and independent) should:

- ***Strictly follow the manufacturers' instructions on proper usage of the powered industrial trucks (PITs) such as telescopic handlers, and never use any PITs as man-lifts or equip them with any form of personnel work platform, if they are not so designed.***

- ***Require that powered industrial trucks, such as telescopic handlers, are not modified or authorized to be modified in any way.***
- ***Perform a hazard assessment before starting any work project that involves material movement and the lifting of workers in order that the correct equipment is selected for use.***
- ***Develop and implement a fall protection plan that includes training and equipment requirements to protect all employees, subcontractors and site workers who may work at heights six feet or more from the ground or lower story.***
- ***Require that all workers who operate powered industrial trucks (PITs) have received the required training and are certified to operate the specific machinery in use at a work site.***
- ***Establish and clearly communicate an enforcement policy for all employees, subcontractors and site workers that states that work practices are expected to be performed in a manner consistent with applicable ANSI regulations, OSHA standards and company health and safety policies and consequences will be applied if there is a failure to do so. Accountability for ensuring that compliance is maintained is the responsibility of the employers and contractors, including general contractors on a multiemployer work site.***

Additionally,

- ***Local town governing bodies and codes enforcement officers should consider modifying building permit applications to require building permit applicants to certify that they will follow written fall protection plans in accordance with applicable standards and regulations, for any projects that involve working at heights above 6 feet, before the building permits can be approved.***
- ***Local town governing bodies and codes enforcement officers should receive additional training to upgrade their knowledge and awareness of high hazard work, including work at elevations.***

INTRODUCTION

In October 2007, a 44 year-old male, self-employed master stonemason sustained fatal injuries after falling approximately 30 feet from an elevated work platform that was attached to the forks of a telescopic handler at a residential construction site. The New York State Fatality Assessment and Control Evaluation Program (NY FACE) learned of the incident from newspaper articles the next day. The Occupational Safety and Health Administration (OSHA) investigated the incident. The NY FACE staff met and reviewed the case information with the OSHA compliance officer, interviewed and communicated with the GC employee who was working on the day of the incident, and discussed the technical aspects of the telescopic handler with the vice-president of engineering safety for the manufacturer of the telescopic handler. This report was developed based on the information provided by OSHA, additional information provided by the GC employee and the vice-president of the telescopic handler manufacturer, as well as information from the county Sheriff's Department, the Medical Examiner's office and the death certificate.

The victim had been a custom stonemason for over 20 years, specializing in the design and construction of stone fireplaces. At the time of the incident, he was hired by a GC to work on a residential renovation project at a 19th century mansion. The GC and the victim had worked together on other residential projects and were personal friends. The victim, who had one employee, had spent the last two years working on the house, fireplaces, chimney and exterior stucco. The GC owned a small construction business with less than 10 workers and assigned his employees to the project as needed. The GC was not always present on the job site. On the day of the incident, the GC had only one employee on the work site. The company did have a written health and safety (H&S) program

and was working with the NYS Department of Labor consultative services. The consultant had conducted an inspection two weeks prior to the incident and determined that training and documentation of training on topics such as hazard assessment, fall protection and the operation of a powered industrial truck (PIT) were deficient. Recommendations from the consultant included improving completion of required training and improving record keeping. Though the GC employee at the work site at the time of the incident indicated that he had operated the telescopic handler before, neither he nor any of the other employees of the GC were trained and certified to operate PITs or the specific telescopic handler in use at the work site as required by OSHA standards.

INVESTIGATION

The renovation project included the construction of a second story addition at the northeast corner of a stone and masonry mansion (Photo 1). The terrain around the mansion was sloped and uneven; the rear side of the second story addition was 3 full floors above the ground level (Photo 2).



Photo 1 Second story addition
(courtesy of OSHA)



Photo 2 Sloped terrain
(courtesy of OSHA)

The telescopic handler involved in the incident was owned by the GC. This powered industrial truck (PIT), also referred to as a telehandler, rough terrain forklift or all-terrain forklift, had a maximum lift capacity of 6000 pounds and a telescopic boom with a maximum working height of 36 feet to reach higher elevations or access otherwise hard-to-reach spaces. At the time of the incident the boom was extended vertically about 25 feet and also extended horizontally approximately 16 feet, with a 9 foot high, double tiered platform attached. The manufacturer's warning plate inside the telescopic handler stated that the machine must not be used as a man-lift or equipped with any form of personnel work platform as it could result in death or serious injury (Photo 3). The manufacturer warned in the General Safety section of the operating manual that unauthorized modifications to the machine may impair the safety and machine function. The telescopic handler was observed by the OSHA investigator to be well-maintained in appearance, the operating manual was in the cab, and no operational problems were found when it was tested on the ground after the incident. The platform stability and the guardrail strength were not tested after the incident.



Photo 3 Warning Plate Inside Cab(courtesy of OSHA)

The double tiered platform was built two weeks prior to the incident by the victim and the GC employee who was present at the time of the incident. The platform was constructed of 2' x 4' lumber and plywood secured with metal deck screws; the final dimensions were 12' long, 4' wide and 9' high (Photos 4 and 5). It was fastened to the forks of the telescopic handler by “D” shackles and wooden wedges (Photo 6). A guardrail system was built on 4 sides of the platform with a top rail at a standard 42” height. The front side of the platform was equipped with metal brackets which allowed the guardrails built for the front of the platform to be removed. The upper tier of the platform was approximately 5 feet above the floor of the bottom tier. The total weight of the platform materials (lumber, plywood, bracing, clamps), equipment and supplies (tools, paintbrushes, paint, 5 gallon pails of stucco and water, mixing tray, 55 gallon plastic bucket of wood scraps) and occupant was estimated at 900 pounds at the time of the incident.



Photo 4 Two-tier Platform
(courtesy of OSHA)



Photo 5 Upper Tier
(courtesy of OSHA)



Photo 6 Platform fastened to forks (courtesy of OSHA)

Numerous deficiencies were noted in the design, construction and operation of the platform.

- The two tier design resulted in a platform occupant floor height of 5 feet above the forks. The floor of the platform may not be located more than 8 inches above the normal load supporting surface of the forks per ANSI standards (B56.6).
- The floor of the platform was not a slip resistant surface, as required by ANSI standards.
- The length of the platform floor at 12' exceeded the maximum total allowable platform dimension of 9' 8". ANSI B56.6 8.25.1(b) requires a maximum length to be determined by measuring the width of the PIT across the load bearing tires plus 10" on either side. The width of the PIT in this incident measured 8 feet.
- No lanyard anchorage points for fall protection systems were installed on the platform.
- The design of the platform required that the platform be positioned from the cab of the telescopic handler and did not allow for any control by the occupant of the platform. This is not considered to be a deficiency, provided that when there is an occupant working at elevation in the platform, the operator is on the PIT or within 25 feet with the PIT visible. At the time of the incident, the GC employee was in the cab. During other work periods however, there was no operator in the cab or within 25 feet with the PIT visible.
- The wheels of the PIT were not chocked as the victim worked on the elevated platform.
- A ledge was built on the upper tier and had the potential to be used to achieve additional height in the platform. ANSI standards (B56.6) prohibit the use of railings, planks, ladders, etc. on the platform for the purpose of achieving additional reach or height.
- The materials and tools on the platform were not secured to prevent any displacement or movement.
- 100% tie-off during platform to structure transfers and entry/exit three point contact safety procedures were not used. The platform was not lowered to the ground to allow for personnel to enter/exit. The victim had been observed climbing on parts of the telescopic handler, attempting to enter and exit the platform without any fall protection.

On the day of the incident, the victim arrived at the work site after 8AM to work on the exterior of the addition. He worked alone, since his mason assistant was absent from work on that day. The victim was standing on the right side of the second tier of the platform, painting the metal trim at the northeast corner and applying stucco to the exterior of the house. The work platform was positioned to the left of the area he was painting, only inches from the rear wall of the addition. The PIT was not running.

The victim had been observed by the GC employee on site positioning the platform with the telescopic handler and then accessing the platform from a step ladder on the balcony or by climbing down into the platform from the roof jacks (Photo 7). The front guardrails were not installed on the platform. The victim was working with the unprotected front side of the platform facing the building; he was not wearing any type of personal fall protection.



This is the area where the victim was applying stucco and painting trim when the incident occurred. The telescopic handler platform was positioned to the left of this area.

Photo 7 Note the stepladder on the balcony and extension ladder access to the roof. (courtesy of OSHA)

The GC had only one employee on the work site on the day of the incident; he was building doors inside the house. He and the victim were the only two workers on site when the incident occurred. At approximately 3:15PM, the victim asked the employee to lower the platform slightly when the victim was ready. The victim and the GC employee had established a verbal means of communication to communicate this readiness. Two-way radios and hand signals were not used. According to the employee, he went down to the ground level and climbed into the cab of the telescopic handler but did not start the machine or move the boom. He stated that he could not see what the victim was doing since the boom of the machine was elevated and the platform blocked his view. The employee stated that no further communication occurred between him and the victim after he reached the ground level and entered the telescopic handler cab. The employee stated that the incident happened at approximately 3:20PM when he was sitting in the cab, waiting for the victim to exit the platform to the roof and to tell him to lower the platform. He looked up and saw a paint brush fall, then saw the victim fall, strike a stone balcony, and land on the ground at the base of the building. The employee immediately called 911 on his cell phone. The GC employee ran to the highway to flag down the EMS, who responded within minutes. The victim was transported to a local hospital where he was pronounced dead from severe head and upper body injuries.

Findings included the following:

- The OSHA investigation report noted that a full box of deck screws had fallen from the platform and were found scattered in the cab and on the machine surfaces above the cab. An

overturned 55 gallon plastic trash can containing scrap wood was found on the platform. The OSHA investigator found that these items were indicators that there was a sudden shift, tilt or erratic movement of the platform.

- The GC employee who helped to fabricate the platform stated that there was some play in the platform, inherent to the bounce built into the boom of a telescopic handler. He also indicated that the victim may have been working at extended reach off to one side of the platform, increasing the potential for bouncing of the platform. The potential would be further exacerbated in this case, since the platform exceeded the maximum allowable length. If there is greater moment (product of load and distance from the fulcrum) at one end of the platform, the platform will try to move downward at the end with the greater moment, similar to the operation of a teeter-totter, according to the manufacturer of the PIT.
- The combination of the vertical and horizontal extensions of the boom at the time of the incident almost exceeded the reach capacity of the telescopic handler. This placed the lifting conditions at the upper limit of a feasible lift as indicated on the lift capacity curve for the telescopic handler. This scenario may contribute to the decreased stability of any attached platform and could result in an increased potential for tipping of the platform with little or no warning. The load limit decreases through the arc of the lift capacity curve with increased lateral (horizontal) extension.
- The position of the boom at the time of the incident placed the lift conditions close to the weight capacity of the telescopic handler. The ANSI standard defines the upper load limit for an unbalanced, personnel platform (load) that is not at a 24 inch load center as one third of the standard load curve recommended capacity. The lift capacity curve recommended capacity at the vertical and horizontal extensions of the boom at the time of the incident is 3000 pounds. The upper load limit at this position is approximately one-third of this value or 1000 pounds. The weight of the platform, equipment and occupant were estimated conservatively at 900 pounds, approaching the upper limit of the load limitations for a personnel platform.
- The telescopic handler was positioned on a small, sandy area at the rear of the building. Although the area was relatively flat, the surface was rutted and irregular, another condition that is known to contribute to increased instability of an elevated platform (Photo 9).



Photo 8 Rutted, uneven surface where the telescopic handler was positioned (photo courtesy of OSHA)

- No personal fall protection equipment or fall arrest system was found on the site, which had work elevations approaching 40 feet above the ground. The subcontractor and other employees worked at elevated heights without training records, without fall protection, without acceptable entry/exit three-point contacts and 100% tie-off access methods, and without enforcement by the general contractor.

Since the view of the GC employee who was operating the PIT was obstructed by the platform, there was no witness to the fall. It could not be determined whether the fall occurred while the victim was still working in the platform or when he was attempting a platform to structure transfer. Though the exact manner and cause of the fall cannot be determined, NY FACE investigators identified multiple factors contributing to this incident. The use of the platform on the telescopic handler as a work surface for the victim directly contributed to the cause of the fatality. The use of a fall protection system, safe work practices at elevations, and front guardrails may have prevented the fatality. The telescopic handler was not the correct PIT for the job. After the incident, the GC removed the telescopic handler and brought in an aerial work platform, designed for lifting personnel. The GC and his employees received the required PIT training and evaluations were performed specifically on the operation of the aerial work platform.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: *Employers and contractors should strictly follow the manufacturers' instructions on proper usage of the powered industrial trucks (PITs) such as telescopic handlers, and never use any PITs as man-lifts or equip them with any form of personnel work platform, if they are not so designed.*

Discussion: Employers and contractors should never use a powered industrial truck (PIT), such as a telescopic handler, as a man-lift or equip the machine with any form of personnel work platform, unless the specific PIT is designed by the manufacturer for that purpose. If PITs are designed only for material handling, the manufacturer provides warning plates on the equipment, in the cabs, as well as specific directions in the operating manual not to use as a man-lift or equip the PITs with any form of personnel work platform. Most plates or directions state that failure to heed the warnings could result in death or serious injury. If the manufacturer's operating manual states that a PIT is not to be used for elevating personnel platforms, use of the equipment to support such a platform and elevate personnel should be prohibited. Manufacturers cannot establish the range and capacity limitations for handmade or improper makeshift work platforms and they cannot assure the ability of a non-approved platform to perform its intended function safely. Strict adherence to the safety instructions from the manufacturer is necessary.

A telescopic handler is not usually designated for use in elevating personnel. The machine is intended primarily for material handling. However, workers continue to use telescopic handlers as man-lifts and many incidents and fatalities have occurred when workers have fallen off of the forks or off of the pallets loaded onto the forks. As per discussions with representatives of some telescopic handler manufacturers, work platforms have been created in recent years for use with their telescopic handlers in an attempt to prevent these types of fatalities with their equipment. Manufacturers have modified the design of these telescopic handlers with improvements to areas such as the wheelbase, transmission, weight distribution and counterweights, to enable the equipment to pass the stability testing that will allow them to be used as man-lifts. All PITs must go through a series of stability tests, designed to determine compliance with ANSI B56.1 and B56.6 standards. Even though the lifting mechanisms appear to be the same, the testing procedures are different for PITs used to lift materials than for PITs used to lift personnel and the tolerances are much stricter for a man-lift than for a material handler.

Two of the primary concerns with the use of a telescopic handler with an attached unapproved platform are the bouncing of an occupant(s) and the tip over of a platform and the PIT.

- The two front wheels and the rear-axle pivot point form the telescopic handler stability triangle with the center of gravity (CG) located on the narrow end of the triangle, aligned with the center line of the telescopic handler. If the CG remains oriented inside this stability triangle, a telescopic handler will remain upright. As the personnel work platform is raised, the extended boom acts as a lever moving the CG up and to the rear, shrinking the stability triangle. The lifting capacity quickly decreases as the distance between the front of the wheels and the center of the load increases. This could result in the PIT beginning to tip. A PIT with a 5,000 pound capacity with the boom retracted may only be able to safely lift as little as 400 pounds with the boom fully extended at a low boom angle.
- A small movement in the boom of a telescopic handler can result in large movement at the height of the platform. An experienced operator is needed to provide smooth, controlled movements of the joystick when moving an occupied platform on a telescopic handler. Even after the PIT is shut off after movement of the boom, there is the potential for a significant amount of residual energy or momentum to remain in the mass of the boom and the platform; some bouncing of the platform could occur.
- The typical ratings for a telescopic handler used for lifting materials are based on a homogeneous 48 inch cube (load) with a 24 inch load center. The resultant lift capacity curve is typically posted in the cab of the PIT. A safety factor is built into the curve to protect against other than ideal conditions, such as unforeseen problems with wind, ground conditions, and experience level of the operator. However, when determining whether a load can be safely handled, an operator should exercise caution with handling loads that cause the PIT to approach its maximum design characteristics in order to prevent a lift that is outside of the chart from tipping the load. The lift capacity curve is not applicable for lifting materials that have other than a 24 inch load center and is not applicable when lifting personnel. Each combination of telescopic handler and personnel platform requires a unique load curve. The lift capacity is derated and allowable loads are significantly less, since the load center in an occupied work platform is always moving and virtually always above or beyond the 24 inch load center. No precise rules can be formulated to cover all eventualities and this is one of the reasons why many manufacturers do not allow their telescopic handlers to be equipped with any form of personnel work platform. Telescopic handlers have the potential of bouncing a load and if an unapproved personnel platform is mounted, this bouncing motion may bounce an occupant up and off the platform or cause the worker to lose balance and fall as a result of the movement.

Unapproved platforms are not designed, constructed, erected or maintained in accordance with an approved standard and have not been proven safe for the purpose of lifting workers. In this incident, there was no evidence of tipping of the telescopic handler, but movement of the platform could have resulted in the occupant victim falling from or being catapulted off the platform as he worked on one side of the platform or as he attempted to exit onto the roof.

Recommendation #2: *Employers and contractors should never modify or authorize to modify powered industrial trucks (PITs), such as telescopic handlers, in any way.*

Discussion: Employers and contractors should not modify a powered industrial truck (PIT), such as a telescopic handler, without the written approval of the manufacturer, as modifications and changes

affect the capacity and safe operation of a PIT. Before adding extra parts, eliminating any parts, modifying the load equipment, modifying counterweights, modifying safety related equipment (seat belts, back-up alarm, etc.), or changing the relative position of various parts of the PIT from what they were when originally received from the manufacturer, approval must be obtained. If approval is received from the manufacturer, any modifications or additions to the PIT must be shown on the plates, tags, or decals to reflect any changes in the PIT's capacity, operation or maintenance.

In addition to the written approval, a PIT can only be modified if all means have been exhausted to find other methods of access or if other methods are more hazardous. The efforts required by an employer, GC, or owner to determine if there are other options are not one of convenience. The interpretation of this requirement of ANSI (ITSDF/ANSI B56.6) is associated with an emergency breakdown with no immediate corrective action or to minimize further property damage or danger to the environment. An informed judgment would be necessary about whether any other equipment could be used, such as an aerial lift or scaffold.

Before starting work on jobs involving material movement and lifting of workers, employers and contractors should select the right equipment for the job – equipment that is designed to safely meet the requirements of the job tasks and designed for safe performance of job duties. This job hazard assessment and planning should eliminate the need for any modifications to PITs.

Recommendation #3: *Employers and contractors should perform a hazard assessment before starting any work project involving material movement and the lifting of workers in order that correct equipment is selected for use.*

Discussion: Before beginning work that involves the lifting of materials and workers, employers and contractors in the construction industry should perform a hazard assessment for each work project. Unlike the setting of an industrial manufacturing facility where workers perform a given production activity or task at predetermined workstations, the physical environment of a construction site is always changing. Each construction project has unique parameters for lifting; standardized procedures or equipment that may be considered safe in one project may be hazardous in the environment of a different project.

Employers and contractors should collect detailed information about the site conditions and the specific construction activities that need to be performed for each project related to lifting materials and personnel.

- They should review past company accident and injury data from their own company as well as those specific to their type of business.
- They should conduct reviews of each construction project, to ascertain and define the specific applications of the project related to material and personnel lifting. These include activities that will be regularly performed, reach requirements, materials to be moved, personnel to be lifted, weight capacities, reach capacities, visibility, ground surfaces and terrain to place equipment, workplace layouts, hard-to-reach applications even if infrequently accessed, and specific risks that will be encountered in lifting.
- They should review this information with technical lift specialists, safety specialists, and/or qualified consultants to identify the correct equipment to procure.

Following this process to gather specific information to identify hazards and predict safety risk levels supports a safety conscious planning process that can lead to equipment selection that is safer for all

employees, subcontractors and site workers. This planning step should assure that the right equipment is selected for the job – equipment that is designed to safely meet the requirements of the job and the safe performance of job duties, as well as to eliminate the need for any modifications to powered industrial trucks.

In this incident, work site heights up to 40 feet above the ground needed to be accessed, the terrain was sloped with rutted surfaces and limited flat locations for equipment placement, the construction activities of roofing, painting and stucco work required the lifting of materials and workers, and hard to reach areas were identified that required extensions of the platform at or beyond the reach capabilities of the equipment that was selected. Consultations with safety and equipment specialists to review the specific applications required could have led to the selection of the correct equipment to address the specific hazards and site conditions needed to maintain a safe work environment.

Recommendation #4: *Employers and contractors should develop and implement a fall protection plan that includes training and equipment requirements to protect all subcontractors and employees who may work at heights of six feet or more from the ground or lower story.*

Discussion: Employers and contractors should have in place a fall protection plan that protects employees and subcontractors against fall hazards on residential and commercial construction sites. Certainly in occupations such as masons, roofers, and chimney workers, working at heights is an accepted part of the chosen profession and workers are usually comfortable working at heights. However, these workers must still utilize the fall protection systems that have been designated and made available when working at heights six feet or more from the ground or lower story. Employers and contractors should implement thorough planning for this high hazard work at elevations. There should be clear identification of the risks associated with each routine and non-routine task with plans and procedures in place to eliminate them.

As part of the fall protection plan, employers and contractors should also provide a training program for each employee who might be exposed to fall hazards. Quality safety training would provide employees with the necessary knowledge and skills to understand the consequences of noncompliance. The training should enable each employee to recognize the hazards of falling and train each employee in the procedures to be followed in order to minimize these hazards. High risk activities such as transferring from a work platform to a building structure should be included. Copies of all training records should be provided by subcontractors to employers and contractors for any work at elevated heights. If necessary, projects should be delayed until training requirements are met and training records are provided.

Employers and GCs should also provide the physical resources, adequate tools, equipment and materials that make it possible for employees to work safely. Some telescopic handlers are equipped with personnel work platforms; they are powered industrial trucks (PITs) designed by manufacturers for use as man-lifts. Employers and contractors should require that any personnel work platforms that are used are accompanied in the field with literature that proves their compliance with ANSI safety standards. The telescopic handler manufacturer must also approve the use of each specific work platform with its machine. Owners and users of these lifts should require that all work platforms have the required top railings, midrails and toeplates and that all these fall prevention structures are maintained and in place. All gates must be closed and fastened during use. Workers should not attempt to reach out to work areas by climbing on railings or any of the telescopic handler surfaces,

extending the body out of a platform, or stretching or leaning over the edge of the railings, as it places the workers at an increased risk of falling from the platform.

Personal fall protection is also required in telescopic handlers and boom supported lifts; proper equipment should be worn as required by OSHA and ANSI standards. This may include wearing a full-body harness with a lanyard attached to an authorized lanyard anchorage point in the platform. This personal protective equipment (PPE) is intended to keep the worker from being catapulted out of the platform in the event of a sudden boom movement. A 4 ft. or shorter lanyard is recommended to keep the occupant inside of the guardrails. Occupants should wear a full body harness in addition to having the guardrail system. In addition, occupants should enter or leave the platform only if the boom is fully lowered and a three-point contact is maintained during entry and exit. Platform to structure transfers should be discouraged; where this is necessary, employees should enter/exit through the gate only with the platform within one foot of a safe and secure structure such as a roof or stable surface. 100% tie-off is required by OSHA and ANSI during this platform to structure transfer, utilizing two lanyards.

Recommendation #5: *Employers and contractors should require that all workers who operate powered industrial trucks (PITs) have the required training and are certified to operate the specific machinery in use at a work site.*

Discussion: Employers and contractors should require that subcontractors and employees who operate a powered industrial truck (PIT) are fully trained and competent to engage in the use of this potentially dangerous equipment at all times. Training should consist of the successful completion of a formal course of instruction as well as practical training and evaluation of the operator's performance in the workplace on the specific type of PIT that will be used by the employee. Operators should be trained by a person who has the knowledge, training and experience to train and evaluate operators. Refresher training is required by OSHA at least every three years and earlier when circumstances indicate.

In the required training program, operators should receive training in the following specified topics:

- operating instructions, warnings, and precautions for the type of PIT the operator will be authorized to operate.
- location of PIT controls and instrumentation. Controls are not standardized from manufacturer to manufacturer or even in different models from the same manufacturer; workers need to be trained in each of the models they will be using.
- steering, maneuvering, visibility, vehicle capacity and stability
- fork and attachment adaption, operation and use limitations
- operating limitations and any other operating instructions listed in the manual
- surface conditions including ramps and other sloped surfaces that could affect stability
- compositions of loads to be carried and load stability
- continued communication and maintenance of direct line of sight between the employee operating a PIT and an employee being lifted

In addition to the training, it is recommended that operators read the manufacturer's operating manual before operating a PIT and receive training on elevating personnel.

Copies of all PIT training records should be provided to employers and contractors by subcontractors, for the operation of a specific PIT. Project work activities should not commence until the training requirements are met and satisfactory training records are provided.

Recommendation #6: *Employers and contractors should establish and clearly communicate an enforcement policy for all employees, subcontractors, and site workers that states that work practices are expected to be followed in accordance with applicable OSHA and ANSI standards and consequences will be applied if there is a failure to do so. Accountability for this is the responsibility of the employer and contractor, including a general contractor on a multi-employer work site.*

Discussion: Employers and contractors are responsible and accountable to provide a safe work environment for all employees on the work site, including any subcontractors and their employees. In addition to providing training and safety equipment and remediating hazards, employers and contractors should require that compliance with the appropriate formal regulations and standards, another essential component of a good safety program, is implemented.

Employers and contractors should clearly state in a communication to employees, subcontractors and site workers the expectations that are to be followed. These include the standard protocols for safe behaviors and the requirements for the utilization of safety equipment that have been established in company health and safety plans and reinforced at specific training sessions such as work at elevations or the use of powered industrial trucks. Employers and contractors need to require that their employees and subcontractors are performing the work as expected and following safety requirements such as fall protection standards and operation of a powered industrial truck (PIT). They should provide adequate supervision to detect and correct hazards or unsafe behaviors before they can cause an injury or illness. This leadership is necessary to set the example that safety policies and rules must be followed. If an employee believes that working fast is more important than working safe or is rewarded for taking a shortcut, even though knowingly unsafe to all, then the work site safety culture could be described as tolerating unsafe behavior or unsafe actions. Employees and contractors should inspect the work site regularly to observe all employee practices. These safety inspections and follow-up in the form of recognition, counseling and appropriate corrective actions are needed to enforce these activities consistently at all times. Performing work with hazards or practices at the work site that have not been remediated should not be allowed to continue. Enforcement should be diligent, no matter the size of the company or the work circumstances.

General contractors should also require that plans are obtained from any subcontractors on a multi-employer work site that indicate how applicable standards and regulations will be met. These activities should be monitored and ascertained for compliance.

Recommendation #7: **Local town governing bodies and codes enforcement officers should consider requiring building permit applicants to certify that they will follow written fall protection plans in accordance with applicable standards and regulations, for any projects that involve working at heights above 6 feet, before the building permits can be approved.**

Discussion: Local municipalities may consider revising building permits to require building permit applicants to certify that they will follow written fall protection plans for any projects involving work at heights above 6 feet. Statements on the permit applications should be added to indicate that the employer/independent contractor agrees to accept and abide by all standards and regulations governing

the work they do, not just local governing body codes and ordinances. Many residential projects involve work at heights over 6 feet. If construction companies and independent contractors are required to provide written documentation of how the high hazard work at elevated heights will be performed safely as part of the building permit application process, it may prompt the contractors to plan ahead, develop a list of activities involving work at heights above 6 feet, formally assess the hazards, seek assistance in developing the required safety and injury prevention program, and implement the necessary injury prevention measures. These changes on residential as well as commercial work sites may help to prevent work-related falls, one of the leading causes of occupational fatalities among small independent contractors in the nation.

Recommendation #8: Local town governing bodies and codes enforcement officers should receive additional training to upgrade their knowledge and awareness of high hazard work, including work at elevations.

Discussion: Codes enforcement officers perform inspections of construction work sites to determine the compliance of installed work with local code requirements. This provides an opportunity for codes enforcement officers to identify and correct potential hazards before injuries or catastrophes occur. This recommendation to provide additional training to codes enforcement officers may create a proactive mechanism of observation and oversight by the officers who are likely to encounter small employers and independent contractors during their work. Officers should receive additional training to upgrade their knowledge of the fundamentals of fall prevention, including common fall hazards associated with working at elevations, basic fall protection controls and procedures to minimize the risks, selection of appropriate fall protection systems, including personal fall protection equipment, three-point contacts, 100% tie-off, travel restraint and alternative access methods. The officers could inform the employers and contractors of potential hazards, provide fact sheets that highlight the key requirements for the fall protection standards, and check some of the basics of the project such as working elevations and means of access. In addition, they could advise employers and contractors to contact safety experts to learn about and implement fall protection and use of powered industrial trucks (PITs). Work could be halted until the appropriate equipment and fall protection is in place. This may be an effective accident prevention strategy, reaching the thousands of untrained and unprepared small employers and independent contractors with awareness and guidance, the very construction workers for whom falls are the leading cause of fatalities in the nation.

Keywords: powered industrial trucks, PIT, telescopic handler, telehandler, rough terrain forklift, all terrain forklift, homemade platforms, makeshift work platform, unapproved forklift platform, modification to forklift, modifying a forklift, stonemason, work at elevated heights, masons, chimney workers

REFERENCES:

American National Standard and Industrial Truck Standards Development Foundation. ANSI/ITSDF B56.1-2009 (Revision of ANSI/ITSDF B56.1-2005) *Safety Standard for Low Lift and High Lift Trucks*. Issuance October 7, 2009.

American National Standard and Industrial Truck Standards Development Foundation. ANSI/ITSDF B56.6-2005 (ASMEB56.6-2002). *Safety Standard for Rough Terrain Forklift Trucks*. Issuance August 1, 2002.

American National Standard and Industrial Truck Standards Development Foundation. ANSI/ITSDF B56.11.6-2005 (ASME B56.11.6 1992). *Evaluation of Visibility from Powered Industrial Trucks*. Issuance November 15, 1992.

Baxtei, David. *Elevating Personnel with Telehandlers: an Overview of Standards and Requirements*. 2007 SAF-T Conference Presentation: Personnel Work Platform Safety. Long Beach, California. January, 2008.

Braun, Theodore. *Elevating Safety to New Heights*. EHS Today. April 12, 2007.

Butler, Paul. *Worker Shatters Leg in Telehandler Plunge*. Health and Safety Executive. YH/183/10. July 2, 2010. <http://www.hse.gov.uk/press/2010/coi-yh-18310.html>. Accessed 3/24/11.

Electronic Library of Construction Occupational Safety and Health. *Personnel Work Platform Safety: a review of the resources designed to ensure proper use of platforms on telescopic handlers*. Lift and Access Magazine. January, 2008.

Fluid Power Safety Institute. *Case Histories: Mobile Aerial Lift Equipment*. Fluid Power Safety Alert Ref. No. SA-002. http://www.fluidpowersafety.com/fpsi_alert-02.html. Accessed 6/30/10.

Forklift Action Global Materials Handling online. *Lift Equipment for Moving People*. Discussion April 19, 2008. http://www.forkliftaction.com/forum/discussion_1774.html. Accessed 3/3/11.

Gray, Paul K. *Telehandler Training Courses are a Necessity to Ensure Safe Operation of Telehandlers*. Ezine. April 13, 2010.

Heavy Equipment Forum. *Work Platform Width*. Discussion February 7, 2010. <http://www.heavyequipmentforums.com/archive/index.php/t-16776.html>. Accessed 3/24/11.

Heavy Equipment Info.Com. *Telehandler Popularity Increases Concerns of Safe Operation*. Lift Equipment Safety. <http://liftequipmentsafety.blogspot.com/2008/>. Accessed 9/21/2010.

HSENI. *Dangers of Non-Integrated Work Platforms on Forklift Trucks and Telescopic Handlers*. October 19, 2009. <http://www.hseni.gov.uk/news.htm?id=5699&dangers-of-non-integrated-work-platforms-on-forklift-trucks-and-telescopic-handlers>. Accessed 6/30/10.

Journal of Light Construction. *Telescopic ManLift*. December 6, 2005. Archived. Accessed 3/3/11.

Kilbourne, Chris. *Forklifts: 7 Tips for Keeping Workers Safe*. Cal.OSHA Compliance Advisor. July 20, 2009. http://safetydailyadvisor.blr.com/archive/2009/07/20/forklifts_safety_accident_prevention.aspx. Accessed 6/30/2010.

McCann, Michael. *Deaths in construction related to personnel lifts, 1992-1999*. The Center to Protect Workers' Rights. December, 2003. <http://www.sciencedirect.com/science/article/pii/S0022437503000719>. Accessed 6/30/10.

McLaren, Rory S. *Aerial Lift Platforms – Case Histories*. Fluid Power Safety Institute Safety Alert Ref. No. SA-024. October 18, 2007. http://www.fluidpowersafety.com/fpsi_alert-24.html. Accessed 6/30/10.

McLaren, Rory S. *Is a Forklift a Safe Substitute for an Aerial Platform?*. Fluid Power Safety Institute Safety Alert Ref. No. SA-039. October 18, 2007. http://www.fluidpowersafety.com/fpsi_alert-39.html. Accessed 6/30/2010.

MIOSHA Department of Labor and Economic Growth. *Rough Terrain Forklift Truck scaffolds: equipment requirements and employee safety requirements*. Construction Safety Standards-1309 (05/05) R408.41243. Part 12 Scaffolds and Scaffold Platforms.

Newell, Seth. *Fall Protection Requirement for Residential Construction Deadline Looms*. Real Safety. March 30, 2011. Archived. Accessed 4/19/11

NIOSH. *Worker Deaths by Falls: a summary of surveillance findings and investigative case reports*. Cinn., Ohio. U.S. Department of Health and Human Services, Public Health Services, Center for Disease Control and prevention, National Institute for Occupational Safety and Health. DHHS(NIOSH) Pub. No. 2000-116. Accessed 6/30/10.

NIOSH FACE PROGRAM Fall case reports state review. <http://www2a.cdc.gov/NIOSH-FACE/state.asp?Category=0007&Category2=ALL&Submit=Submit>. Accessed 6/30/10.

Occupational Safety and Health. *Construction Worker Deaths During Aerial Lift Use Occur Most Often at Heights of 10 to 29 feet*. Vol.37, Number 49, December 13, 2007. Archived. Accessed 6/30/10.

O'Connell, Thomas and Walls, Douglas. *Stability of Powered Industrial Trucks*. Guide to Forklift Operator Training. NC Dept. of Labor. Occupational Safety and Health Divisions. February, 2011.

Operation and Safety Manual. *Telehandler Personnel Work Platform*. December 10, 2008. (Manufacturer omitted to maintain confidentiality)

OR-OSHA Fatal Fall Alert. *Gravity Kills*. Oregon FACE. <http://www.orosha.org/pdf/hazards/2993-03.pdf>. Accessed 6/30/10.

OR-OSHA 221 Forklift Safety: Stability Chapter, pages 3-5. <http://www.cbs.state.or.us/external/osha/pdf/workshops/1251w.pdf>.

OSHA. *29CFR1910.178*. Powered Industrial Trucks. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9828

OSHA. *29CFR1926.451*. Scaffolds: General Requirements. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10752

OSHA. *29CFR1926.453*. Scaffolds: Aerial Lifts. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10754

OSHA. *29CFR1926.501*. Fall Protection: Duty to Have Fall Protection. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10757

OSHA. *29CFR1926.503* Fall Protection: Training Requirements. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10759

OSHA. *29CFR1926.602*. Material Handling Equipment. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10769

OSHA Compliance Directive for Fall Protection in Residential Construction. December 22, 2010. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=FEDERAL_REGISTER&p_id=21875. Accessed 1/11.

OSHA Compliance Guidance for Residential Construction.Instruction. December 16, 2010. <http://www.osha.gov/SLTC/residential/index.html>. Accessed 4/19/11.

OSHA News Release: U.S. Labor Department. *U.S. Labor Department's OSHA acts to protect residential roofing workers*. December 22, 2010.

OSHA News Release: U.S. Labor Department. Fall protection directive upheld in U.S. Court of Appeals. April 14, 2011. <http://www.dol.gov/opa/media/press/osha/OSHA20110543.htm> . Accessed 4/19/11.

OSHA Standard Interpretation relative to compliance of an aerial lift fall protection device. February 2, 2004. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=24774. Accessed 6/30/10.

OSHA Standard Interpretation relative to elevating personnel and operator training. September 30, 1999. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=23331. Accessed 6/30/10.

OSHA Standard Interpretation relative to fall protection, training, inspection and design requirements of aerial lifts. February 23, 2000. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=interpretations&p_id=24191. Accessed 6/30/10.

OSHA Standard Interpretation relative to ingressing and egressing and elevated manlift. September 5, 1995. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=21918. Accessed 6/30/10.

OSHA Standard Interpretation relative to lifting personnel on a platform supported by a rough terrain forklift. November 27, 2001. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=24412. Accessed 6/30/10.

OSHA/AEM Alliance Annual Report. October 21, 2008.

OSHA/AEM Alliance Best Practices Bulletin. *Preventing rough-terrain forklift accidents*. May, 2009. <http://www.aem.org/AllDocuments/AEM/SRT/SRTTopics/Personnel%20work%20platform%2008-05-11%20Final.pdf>. Accessed 1/11.

Paskell, Mark. *New OSHA Directive on Fall Protection for Contractors*. December 28, 2010. <http://www.thecontractorcoachingpartnership.com/> Accessed 3/2/11.

Proctor, Robert. *OSHA Adopts New Fall Protection Rules for Residential Builders*. Wisconsin Builders Association. January 6, 2011. <http://axley.com/alerts/osha-new-fall-protection-rules-011011>. Accessed 3/2/11.

Scott, Graham. *Telehandler Safety*. Farm Trader. August 3, 2009. <http://www.farmtrader.co.nz/View/Article/Telehandler-safety/2019.aspx?Ne=145&N=4294960430>. Accessed 1/11.

Saskatchewan Labor Occupational Health and Safety Hazard Alert. "Worker falls from a "homemade" work platform". April, 2003. <http://www.lrws.gov.sk.ca/worker-falls-homemade-work-platform>. Accessed 3/2/11.

Society for Protective Coating (SSPC). *Safety Tips for Aerial Lifts*. June, 2003. http://www.imacorp.com/loudroute/system/data/user_uploads/4/File/2010%20June/Aerial%20Lifts%206-2010.pdf. Accessed 3/23/11.

Stewart, Larry. *Rough Terrain Forklifts: Stability Triangle Determines if Telehandlers Tip*. Construction Equipment. July 1, 2008. <http://www.constructionequipment.com/stability-triangle-determines-if-telehandlers-tip>. Accessed 3/3/11.

Stewart, Larry. *Accept Telehandler Limits Before Lifting People*. Construction Equipment. June 30, 2008. <http://www.constructionequipment.com/accept-telehandler-limits-lifting-people>. Accessed 3/8/11.

Telescopic Handler Specification Sheet (manufacturer omitted to maintain confidentiality).

Trinity Safety. *OSHA Taking Action to Protect Residential Roofing Workers*. January 20, 2011. <http://www.trinitysafetygroup.com/news/general/osha-taking-action-to-protect-residential-roofing-workers/>. Accessed 4/19/11.

Worksafe Accidents. *Worker Falls 18 meters to his Death*. Safety Bulletins. September 16, 2010. http://www.wamtraining.com.au/worksafe_accidents.html. Accessed 3/23/11.

Yang, Lee Tzu. *Case Studies: Construction Industry*. Workplace Safety and Health Council. June, 2008.

The New York State Fatality Assessment and Control Evaluation (NY FACE) program is one of many workplace health and safety programs administered by the New York State Department of Health (NYS-DOH). 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), the NY FACE program collects information on occupational fatalities in New York State (excluding New York City) and targets specific types of fatalities for evaluation. NY FACE investigators evaluate information from multiple sources and summarize findings 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. The NY FACE program 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 NY FACE program can be obtained from:

New York State Department of Health FACE Program

Bureau of Occupational Health

Flanigan Square, Room 230

547 River Street

Troy, NY 12180

1-518-402-7900

www.nyhealth.gov/nysdoh/face/face.htm