
INCIDENT HIGHLIGHTS

**DATE:**

October 8, 2019

**TIME:**

8:15 a.m.

**VICTIM:**

58-year-old mechanic
service technician

**INDUSTRY/NAICS CODE:**

Industrial Machinery
Wholesale/423830

**EMPLOYER:**

Equipment service and
sales company

**SAFETY & TRAINING:**

No specific lockout/tagout
training

**SCENE:**

Loading dock of a medical
supply company

**LOCATION:**

New York

**EVENT TYPE:**

Struck by

REPORT#: 19NY038

REPORT DATE: 8/10/22

Mechanic Service Technician Fatally Struck by Order Picker Carriage — New York

SUMMARY

At 8:15 a.m. on October 8, 2019, a 58-year-old male mechanic service technician for an equipment service and sales company was fatally crushed by the carriage of an order picker forklift. The incident occurred at a client's site where the decedent was servicing the order picker with a co-worker. The carriage, weighing approximately 1,163 pounds (lbs.), consists of an operator platform, control console, and lift forks... [READ THE FULL REPORT](#) (p.3)

CONTRIBUTING FACTORS

Key contributing factors identified in this investigation include:

- The snap ring was removed from the cylinder
- The elevated carriage was neither blocked nor secured to prevent it from falling
- The victim was standing under elevated carriage which was neither blocked nor secured ... [LEARN MORE](#) (p.8)

RECOMMENDATIONS

New York FACE investigators concluded that, to help prevent similar occurrences, employers should:

- Develop specific lockout/tagout procedures for service technicians to follow when servicing lift trucks such as order pickers.
- Ensure that service technicians follow manufacturer's safety requirements, and employees should strictly follow the standard safety procedure.
- Conduct job hazard analysis (JHA) to identify hazards and risk factors associated with lift truck maintenance and repair services... [LEARN MORE](#) (p.8)



NEW YORK

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SUMMARY

At 8:15 a.m. on October 8, 2019, a 58-year-old male mechanic service technician for an equipment service and sales company was fatally crushed by the carriage of an order picker forklift. The incident occurred at a client's site where the decedent was servicing the order picker with a co-worker. The carriage, weighing approximately 1,163 pounds (lbs.), consists of an operator platform, control console, and lift forks. The carriage can move up and down on the order picker's mast, and the movement is actuated by a center lift hydraulic cylinder and a pair of side lift cylinders along with a set of chains and pulleys. The hydraulic pressure for the center lift cylinder was over 2,000 pounds per square inch. The center lift cylinder had a minor leak, and the decedent and the co-worker were on site to repack the cylinder (replacing the cylinder parts) on the day of the incident. To access the cylinder, they removed the control console cover and raised the carriage approximately seven feet high. The co-worker went to his van to fetch a pair of locking chains so that they could secure the elevated carriage to the mast with the chains to prevent the carriage from falling. They then realized that they had the wrong packing kit with them. They could not repack the cylinder that day since they had to go back to their shop to get the correct kit. According to the co-worker, the decedent was holding a pair of snap ring pliers while standing directly underneath the carriage that was neither chained nor blocked. At about 8:15 a.m., the decedent removed the outer snap ring from the cylinder with the pliers apparently to verify the part number. The function of the outer snap ring (aka retaining ring) is to hold and secure the oil seal of the cylinder at the rod end. While the decedent was telling his co-worker that he just wanted to look at the ring, the carriage fell quickly crushing the decedent underneath. Meanwhile hydraulic fluid sprayed over the entire dock area. The police, fire department, and EMT arrived at the scene within minutes. However, the rescuers were unable to revive the service technician who was pronounced dead at the scene.

INTRODUCTION

At 8:15 a.m. on October 8, 2019, a 58-year-old male mechanic service technician for an equipment service and sales company was fatally crushed by the carriage of an order picker forklift. The incident occurred at a client's site where the decedent was servicing the order picker with a co-worker. New York State Fatality Assessment and Control Evaluation (NY FACE) staff learned of the incident from news media reports and contacted the employer to initiate an investigation. The employer neither granted a site visit nor provided the documents requested by NY FACE. The Occupational Safety and Health Administration (OSHA) investigated the incident. The NY FACE investigator obtained the case information from OSHA and reviewed the order picker maintenance manual, police report, and death certificate. The employer did not give NY FACE permission to use the information in the order picker maintenance manual including the photos or figures citing proprietary information. This report summarizes the findings of the NY FACE investigation.

EMPLOYER

The equipment service and sales company is based in Pennsylvania (PA) and employs approximately 150 employees. Specializing in material handling equipment, the company provides equipment maintenance services for warehouses, distribution centers, and supply chain operations in multiple states including New York. The equipment serviced by the company ranges from aerial lifts, electric pallet jacks, and different types of powered industrial trucks (PIT aka forklifts) such as order pickers. Company employees are not union members. This was the company's first fatality. According to OSHA Fatality and Catastrophe Investigation Summaries, a mechanic of the company suffered an amputation of his left ring finger while performing maintenance on a forklift in October 2018.

EMPLOYER WRITTEN SAFETY PROGRAMS AND TRAINING

The employer had a written lockout and tagout policy for the service technicians to follow when they performed contract maintenance and repair services at client sites. The policy stated that all technicians are to be trained on lockout/tagout (LOTO) procedures through equipment/dealer specific classes and team meetings. According to the policy, the company is to perform annual audits to ensure that all technicians properly follow the standard LOTO procedures. The employer provided Service Technician Certification from the manufacturer in the following years: 1995, 1996, 2010, and 2013. The service technicians had also taken several written exams on order picker maintenance.

The employer's LOTO program, however, did not outline the specific techniques or procedures to be utilized for servicing particular types of PIT such as the order picker that was involved in the incident. The employer did not provide specific training for the service technicians and verify that employees have achieved proficiency in the LOTO procedure and hazardous energy control methods.

DECEASED WORKER INFORMATION

The 58-year-old service technician had been employed by the company for 34 years. He had received training through multiple training courses and attended tech schools at a PIT manufacturer's facility as well as the employer's Technical Center at the Corporate Office in PA. As the company's most senior service technician, he was experienced, knowledgeable, and proficient in servicing varied brands and models of lift trucks.

EQUIPMENT INVOLVED IN THE INCIDENT

An order picker is a forklift which has an operator platform and lift forks. An operator can elevate or lower the platform along with the lift forks to reach and retrieve stored goods from all tiers of warehouse racking. The order picker that was involved in the incident was a Raymond Order Picker (Model EASI-OPC-30TT) manufactured in 2004. It is powered by a 24-volt electric motor. The order picker weighs approximately 6,975 lbs. with maximum lift capacity of 3,000 lbs. The forks can be raised up to 17 ft and lowered to eight inches above the ground.

The chassis is the basic frame of the order picker: It is composed of the tractor, base, and mast (Photo 1). The carriage, which consists of the overhead guard, the control console, the operator's platform, and the forks, can move up and down on the mast. The carriage movement is actuated by a center lift hydraulic cylinder and a pair of side lift cylinders along with a set of chains and pulleys. The hydraulic pressure of the center lift cylinder was approximately 2,000 lbs. per square inch (psi), and the system hydraulic pressure is 6,000 psi.

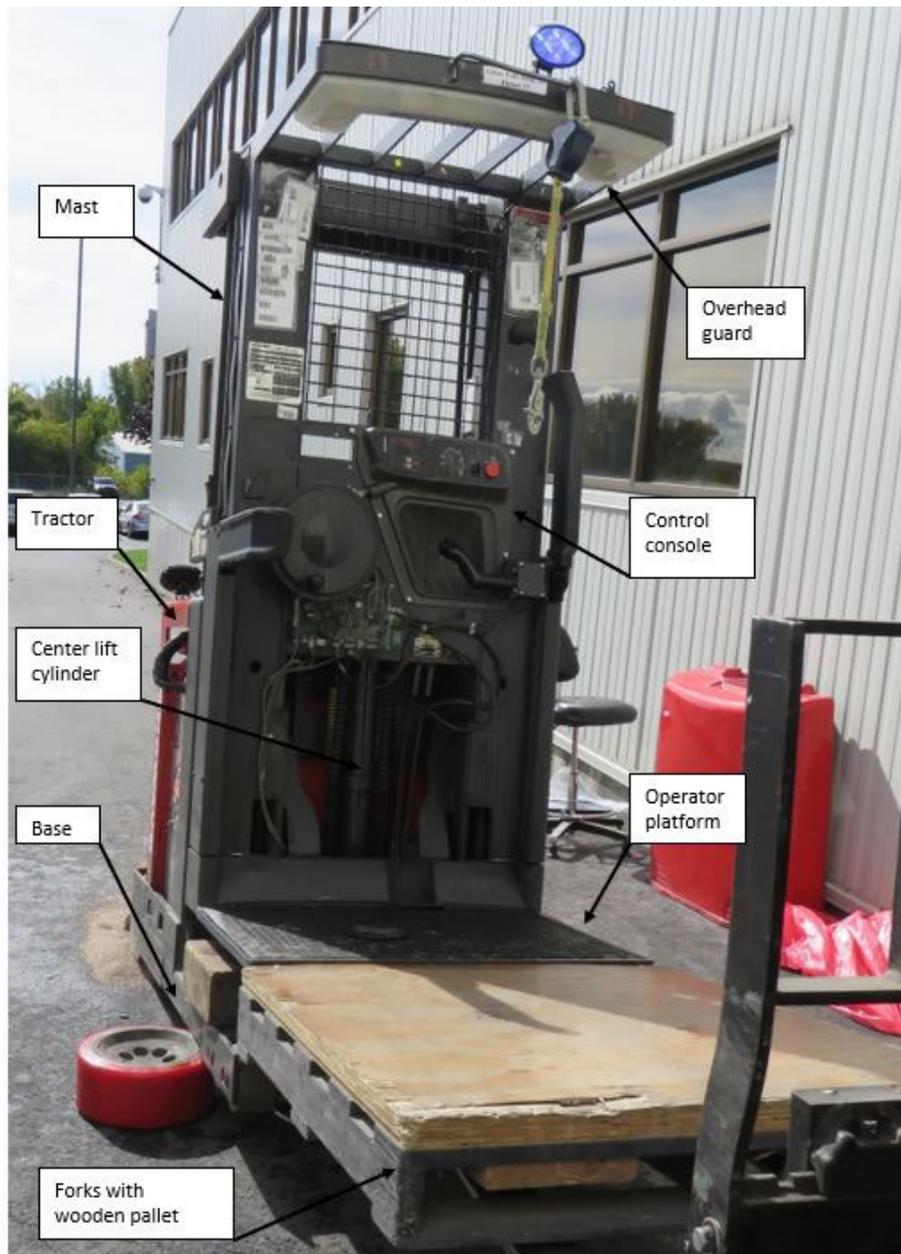


Photo 1. The order picker that was involved in the incident with the console cover removed (Photo courtesy of OSHA).

The order picker had a wooden pallet attached to the forks. According to OSHA, the total weight of the carriage including the wooden pallet was approximately 1,163 lbs. When elevated, the carriage is held solely by hydraulic pressure: The order picker does not have built-in locking mechanism to prevent the platform from free falling in case of a hydraulic system failure. The manufacturer warned that no one should be allowed to stand or pass under load or the lifting mechanism.

According to the manufacturer's service and maintenance manual, a safety stand should be used for any maintenance procedures that have to be done under an elevated carriage. The safety stand is in the shape of a metal rod attached to a metal rectangle baseplate. To place the safety stand, one must first raise the operator platform to allow adequate clearance to perform the work, then place the safety stand underneath the operator platform before lowering the carriage onto the safety stand. To prevent unintentional energization of the order picker, a technician must turn the power key switch to the off position and disconnect the battery connector.

INVESTIGATION

The incident occurred at a medical supply company which contracted the decedent's employer for equipment maintenance service. The medical supply company had nine order pickers; seven of them were the same model as the one involved in the incident. The service technicians, including the decedent, had provided scheduled maintenance and repairs as needed at the site. The medical supply company has a written standard operating procedure (SOP) pertaining to outside contractors. The SOP has general safety requirements, such as contractors "shall never work on energized equipment" and "must follow all applicable LOTO requirements".

On the day of the incident, Tuesday, October 8, 2019, at about 7:00 a.m., the decedent and a co-worker traveled in separate service vans to the medical supply company to service the order picker. The order picker had a minor hydraulic fluid leak on the center lift cylinder. Once at the site, the co-worker drove the order picker to the ramp outside a loading dock and parked before closing the dock door (Photo 2). He then backed his van up onto the ramp and parked it in front of the order picker. Meanwhile, the decedent also pulled his van onto the ramp and parked.

The center lift cylinder leak was identified during a previous maintenance visit a week prior by the decedent and his co-worker. According to the co-worker, the leak was not big or severe enough to prompt the immediate removal of the order picker from operation. However, the cylinder needed to be re-packed to eliminate the leak. Repacking hydraulic cylinders are regularly done when cylinders show signs of leakage. The process includes disassembling the cylinder, replacing the parts, and reassembling the cylinder. The co-worker, who was hired two years ago, was under the tutelage of the decedent. The decedent was supposed to show him how to perform the procedure.

The decedent and the co-worker removed the control console cover to access the center lift cylinder. The manufacturer required that the cylinder had to be removed from the order picker before it could be disassembled and repacked. The maintenance manual specified detailed steps on how to remove the cylinder. The center lift cylinder is located inside the tractor closer to the operator platform side (Photo 1). According to the manual, the cylinder can be removed from the base without having to elevate the carriage. In other words, maintenance technicians do not have to work under the elevated carriage to remove the cylinder.

According to the OSHA investigation, service technicians used locking chains to secure the elevated carriage as an alternative to using the safety stand which is required by the manufacturer. Each technician had a pair of locking chains in his service van. A ladder was used to reach the top of the raised carriage. To secure the carriage, two chains were

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used to wrap around the crossover beam on the mast and down to a gusset on the rear frame of the carriage. The equipment maintenance and sales company did not have written SOP on how to secure the elevated carriage.



Photo 2. Post incident scene: The order picker was parked on the inclined ramp outside the loading dock during the incident. The forklift on the right was used in the rescue to lift the platform off the victim (Photo courtesy of city police department).

The decedent and the co-worker removed the control console cover first. They then raised the carriage to approximately seven ft. above the base. The reason that they did not remove the cylinder with the carriage on the ground level was unknown. The co-worker went to his van to fetch the chains so that they could secure the elevated carriage. They then realized that they had the wrong packing kit with them. The workers did not chain the carriage since they could not repack the cylinder that morning. They had to go back to their shop to get the correct packing kit.

According to the co-worker, the decedent was holding a pair of snap ring pliers while standing directly underneath the elevated carriage that was neither chained nor blocked. At about 8:15 a.m., the decedent removed the outer snap ring with the pliers from the rod end apparently to verify the part number. The function of the outer snap ring (retaining ring) is to hold and secure the oil seal of the cylinder at the rod end. While the decedent was telling his co-worker that he just wanted to look at the ring, the carriage fell quickly. The decedent was crushed underneath the operator platform, and the hydraulic fluid sprayed the entire dock area.

The co-worker immediately tried used a jack trying to raise the carriage, but he was unable to raise it. He quickly notified the employees of the medical supply company inside the building. One employee immediately called 911, and another notified the company's occupational health nurse who paged "code blue" for medical emergency. Meanwhile, a third employee tried to lift the order picker off the decedent with a forklift, but the effort failed. The police, fire department, and EMT arrived at the scene within minutes. The rescuers elevated and blocked the carriage and extricated the decedent. However, they were unable to revive the service technician who was pronounced dead on the scene at 9:03 a.m.

CAUSE OF DEATH

According to the death certificate, the immediate cause of death was multiple traumatic compressive blunt force injuries.

CONTRIBUTING FACTORS

Occupational injuries and fatalities are often the result of one or more contributing factors or key events in a larger sequence of events that ultimately result in the injury or fatality. New York FACE investigators identified the following unrecognized hazards as key contributing factors in this incident:

- *The snap ring was removed from the cylinder causing the hydraulic system failure and rapid descent of the carriage.*
- *The elevated carriage was neither blocked nor secured to prevent it from falling.*
- *The victim was standing under elevated carriage which was neither blocked nor secured.*
- *The cylinder was not removed from the order picker before the snap ring was removed.*
- *Employer did not have specific standard LOTO procedures for servicing hydraulic cylinders on order pickers.*
- *Employer did not provide employee training on specific LOTO techniques and procedures.*

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should develop specific lockout/tagout procedures for service technicians to follow when servicing lift trucks such as order pickers.

Discussion: During equipment maintenance and service, unexpected startup or release of stored energy can cause serious injuries and deaths. The service technicians in this case provide maintenance and repair services on lift trucks of various models made by different manufacturers. The carriage of the order picker weighs approximately 1,163 lbs. To prevent worker injury, the manufacturer requires blocking the carriage with a safety stand. The company permitted the use of locking chains to secure the carriage as an alternative locking method. Neither of the methods was in the employer's written LOTO program.

Employers should develop a LOTO program including SOP to control hazardous energy. The SOP should be equipment-, operation-, and task-specific and should clearly define the scope, purpose, and techniques for shutting down, isolating, blocking, and securing equipment. The SOP should also address the risk factors identified through job hazard analysis.

Service technicians are allowed to use locking chains to secure the elevated carriage as an alternative to using a safety stand. Employers should consult the manufacturer to ensure that the alternative locking method is safe and effective. Employers should also assess whether the center lift cylinder can be removed without elevating the carriage. If the assessment determines that the carriage must be elevated for the job, employers should develop a SOP including clear description on how to remove, disassemble, and reinstall the cylinder.

Recommendation #2: Employers should ensure that service technicians follow manufacturer’s safety requirements, and employees should strictly follow the standard safety procedure.

Discussion: The manufacturer requires removing the center lift cylinder before disassembling it and blocking the elevated carriage before working underneath it. Neither of the requirements was followed in this incident. Employers should ensure that service technicians follow manufacturer’s safety requirements when performing maintenance tasks under an elevated carriage.

Most injury incidents can be prevented if both employers and employees follow the established safety rules. It is critical for workers who are involved in high-risk operations or work in hazardous areas to follow standard safety procedures. The consequence of breaching safety protocols can be deadly. Employees should strictly follow the manufacturer’s requirements as well as company LOTO procedures when providing maintenance and repair services on lift trucks.

Recommendation #3: Employers should conduct job hazard analysis (JHA) to identify hazards and risk factors associated with lift truck maintenance and repair services.

Discussion: A JHA focuses on the relationship between the worker, the task, the tools, the equipment, and the work environment so that the hazards associated with each component and each step of the task can be identified before they occur. Employers should conduct JHAs not only on tasks that have high injury rates, but also on the tasks in which one single human error or negligence could lead to severe injuries or deaths.

Removing a center lift cylinder for repacking in this case is a high-risk task. The manufacturer requires the removal of the cylinder before disassembly and blocking the carriage with a safety stand if work must be done with the carriage elevated. Failure to follow these steps can result in serious injuries or deaths. A JHA can identify the hazards associated with the task, and employers can then develop and implement appropriate prevention measures and standard safe work procedures for workers to follow.

Recommendation #4: Employers should ensure that all service technicians receive proper and adequate training on LOTO procedures.

Discussion: Employers should provide employee training and make sure that all workers understand the hazards posed by uncontrolled energies, standard LOTO procedures, and the consequences of not following the LOTO procedure. For the LOTO training to be effective, it should be site-, operation-, equipment-, and task-specific since each type or model of lift truck may have different LOTO protocol and locking devices.

For example, the order picker’s carriage can travel up and down on its mast. Workers must learn how to prevent the elevated carriage from falling either with a safety stand or a pair of locking chains. Service technicians should receive additional training every time when they are assigned to service equipment that has a new or different LOTO procedure that they have not been trained on previously. Refresher trainings should be provided to maintain technicians’ proficiency on LOTO knowledge and skills.

Following an injury incident, a near miss, or a breach of SOP, employers should provide additional training to review the root cause and contributing factors that lead to these events. Employers should discuss with employees the importance of following safety rules, so that workers can learn from these events, review the safety rules as well as their own roles and responsibilities, and gain knowledge and skills to work safely and avoid taking shortcuts to endanger themselves and their coworkers.

Recommendation #5: Employers should develop checklists for high-risk maintenance tasks and require technicians to check each step and sign the checklist.

Discussion: When performing familiar daily tasks, individuals often rely on their knowledge, skills, experience, routine, and habit. However, human minds are not always reliable: People are likely to forget or miss a vital safety step in the process when they are tired, frustrated, rushed, distracted, or complacent. Therefore, it is critical to implement measures that can minimize human errors especially the ones associated with overreliance on memory and experience. Incidents occur more often when people are guided solely by experience or memory without engaging critical thinking. Safety checklists can reduce the occurrence of human errors and increase compliance to established safety protocols by ensuring that the small but essential steps are not forgotten or overlooked.

While a JHA and SOP may have detailed info on how to perform a job safely to avoid what hazards, a checklist should be succinct to serve as a quick reminder of each key step of the task. Separate and specific checklists should be developed for each high-risk task. Employers should know what assignment each technician has at which site and provide them with the appropriate checklists. It is beneficial to have workers who perform the tasks sign the checklists. When a worker works alone at a client's site (off-site) without employer supervision, a checklist can serve as a self-inspection tool. If two or more workers perform the task, all workers involved should sign the checklists. Employers should ensure that the checklists are updated along with the JHAs and SOPs. The checklists can also be used for worker training and safety auditing.

Recommendation #6: Employers should conduct periodic inspections at client sites to ensure the sites are free of hazards and workers follow the safety protocols.

Discussion: The service technicians in this case provide equipment maintenance and repair services at client sites. It is challenging for employers to manage safety for workers who work off-site because employers are not often present to supervise and cannot control site conditions. One proactive injury prevention approach is to survey and inspect these sites to ensure that they are free of recognizable hazards. Employers should conduct periodic inspections at client sites to ensure that workers follow the company safety protocols and appropriate SOPs. Site inspections may identify additional site- or task-specific hazards. Employers can develop proactive prevention measures based on the inspection findings and incorporate them into appropriate company safety programs. Inspection findings should be discussed in company safety meetings to raise awareness of the hazards, near misses, or incidents of not following safety protocols. To promote a culture of safety in the workplace, employers should acknowledge good safety practices observed during inspections.

Recommendation #7: Employers should implement a near miss reporting system to ensure worker safety and the compliance of company safety protocols.

Discussion: A near miss is an unplanned event that did not result in loss but had the potential to do so: Only a "lucky" break in the chain of events prevented an injury, fatality, or damage. Most incidents with loss, both serious and catastrophic, are preceded by near misses. Incident-driven approach is less effective in preventing injuries than a proactive approach. Studying and learning from near misses is a key element of a proactive injury prevention approach.

The service technicians in this case worked off-site without direct supervision from management. Managers likely learn of incidents resulting in reportable injuries, while near misses occur without recognition. Employers should set up a system for reporting, tracking, and investigating near-misses. The reporting system should be non-punitive and anonymous. Each near miss should be investigated, and the investigation results should be used for updating safety programs and worker training.



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INVESTIGATOR INFORMATION

This investigation was conducted by NY FACE, Bureau of Occupational Health and Injury Prevention, Center for Environmental Health, New York State Department of Health.

ACKNOWLEDGEMENT

The NY FACE staff would like to acknowledge the OSHA Albany Area Office for assisting this investigation.