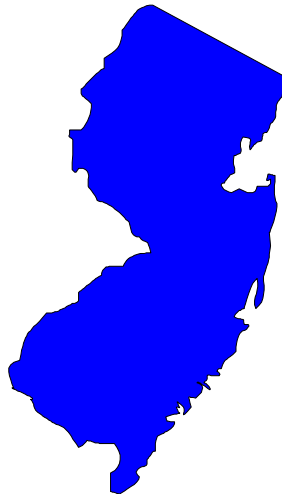


***F.A.C.E.***  
***INVESTIGATION REPORT***  
***Fatality Assessment and Control  
Evaluation Project***

FACE # 97-NJ-114 -01  
Worker Asphyxiated When Caught in Rotating  
Shaft of Cable Reel Trailer



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**TO:** Division of Safety Research  
National Institute for Occupational Safety and Health (NIOSH)  
Morgantown, West Virginia

**FROM:** Fatality Assessment and Control Evaluation (FACE) Project  
New Jersey Department of Health and Senior Services (NJDHSS)

**SUBJECT:** FACE Investigation # 97 NJ 114 01  
Worker Asphyxiated When Caught in Rotating Shaft of Cable Reel Trailer

**DATE:** August 3, 1998

### ***SUMMARY***

On December 6, 1997, a 26 year-old telecommunications company worker died from injuries sustained when his hand became entangled in a tape he was winding around an unguarded shaft on a cable reel trailer. His clothing also became entangled and he was pulled against the machine. The rotating shaft was normally used for mounting collapsible power reels for cable and functioned as a winch for pulling lines and cable. The worker was attempting to use the unguarded protrusion of the rotating shaft, without the reel, for the same purpose. FACE investigators concluded that, in order to prevent similar incidents, the following safety guidelines should be followed:

- ! The employer should consider appointing one worker in each crew as a supervisor.
- ! All machines should be inspected for unguarded hazards and retrofitted with machine safeguards.
- ! The employer should include hazard recognition in the employees' training.

### ***INTRODUCTION***

On December 7, 1997 the NJDHSS FACE staff was informed of this fatal work-related injury through a newspaper article. With the employer's consent, a concurrent site visit with an OSHA compliance officer was conducted on December 8. Two co-workers were interviewed in the presence of their union representative. A second visit was conducted on December 15. The supervisor of the deceased worker, the corporate safety officer, and a third co-worker were interviewed. The equipment and incident site were observed and photographs taken. Further information was received from the medical examiner, police report, and federal OSHA.

The employer was a telecommunication company that employed several thousand workers in several states. The company had an extensive training program that used formal and on-the-job training for its workers. Formal classroom training included instruction on the use of tools, climbing, personal protective equipment, and recognition of electrical hazards. Informal training included on-the-job instruction by a supervisor or a senior worker. All training was documented. In addition, each worker was given a small pocket-size information booklet during training. The booklet listed references to sections in four manuals kept on each company work truck with topics covered in depth.

Supervisors also had access to the company's electronic mail that provided information on procedures and training. When new equipment was purchased, the manufacturer's or dealer's representative provided training to the workers on the new equipment.

The deceased worked for the company for less than three years as an outside plant technician and was previously employed elsewhere as a mechanic. He attended a two-week session at a company training center and had also been trained on-the-job by senior workers. According to his supervisor, he worked with senior technicians for 1 ½ years and knew the equipment well. A senior technician had trained him on the use of the equipment involved in this incident and stated that the victim knew the machine and was very competent with it. The victim's supervisor observed him using the equipment and performing this type of job many times. He was considered very intelligent and had worked with a variety of partners during his time with the company. The victim was to have been married two weeks after the incident.

## ***INVESTIGATION***

The site of this incident was a company substation consisting of an asphalt parking lot with a small cinder block building. On this cold (temperature in the 30's and windy) Saturday, the five-man crew reported to work at the company garage at 6 a.m.. They had received their assignment the previous day and a senior worker had checked the equipment and supplies to prepare for the job to be done. Their assignment was to "pull" 1900 feet of utility cable from the substation through an underground conduit. There was also an aerial component of the job with which they were not involved. The men discussed the job and decided how they would do it. There was no one assigned as supervisor in the crew. The crew included the victim and his co-worker, also with slightly more than 2 ½ years experience, a technician with 12 years experience paired with his partner, and a senior technician with 35 years with the company.

The crew used three company trucks to travel to the job site and arrived there between 7:30 and 8 a.m.. One truck pulled a 20 year-old hydraulic cable reel trailer carrying a large reel of 2-inch utility cable. When free of the towing truck, the trailer was independently maneuverable. One worker was able to push it or walk with it and position it easily. On the front of the machine were two shafts that spun in tandem. One shaft protruded 5 ½ inches from the side of the machine and functioned as a 2 ½ inch diameter auxiliary shaft for mounting cable uptake reels (see photo, page 6). The center of the shaft was 40 inches above the ground. Controls to move the machine

were independent of controls that ran the spinning shafts, but turning off the ignition deenergized the entire machine.

They parked one truck at a manhole approximately 1000 feet from the substation building. This truck was equipped with a bed winch holding 3/8 inch wire cable. The senior technician worked here alone. A second truck was parked at a second manhole, about 500 feet from the substation. Two men worked at this site. The victim and his colleague, each with the least seniority, parked their truck, with the cable reel trailer attached, at the substation.

A private contractor had previously inserted an 1800 pound test strength, synthetic flat tape (called a mule tape) through an underground 4 inch diameter pvc duct, 1000 feet long. The crew planned to connect the first truck's wire winch cable to the tape at the first manhole and pull the cable through the duct to the substation. There they planned to connect the utility cable to the wire and pull 1900 feet of it, in one piece, back through the length of duct. Usually, they pulled a maximum of 600 feet and another crew later spliced the cable sections together. The wire cable could be pulled by hand or with the assist of a power uptake reel.

They pumped water from the ducts and connected the tape to the wire cable. Using the power uptake reel, about 400 feet of wire cable was pulled from the first manhole to the second. The victim and his colleague were pulling the mule line at the hut. The senior technician went to the hut and saw that the line was taut and feared it might break. Although the winch line was on "free drum," there was still resistance when the wire cable was pulled. To decrease the resistance and make pulling the tape easier, the crew pulled out about 500 feet of wire cable and laid it, snakelike, on the ground at the center manhole. Although workers at the middle section saw the cable advancing, the two men at the hut thought the tape was tight and on the brink of breaking. The workers had experienced situations in the past in which the tape had broken. The two unhitched their trailer and drove their truck to the middle hole where they put their capstan wheel on the other truck and walked back to the substation. The victim worked outside and his co-worker worked inside the building, pulling the tape by hand out of the duct through a porthole. It was becoming very difficult to pull the line, possibly due to sludge in the line, but the co-worker thought it was advancing without a problem. He heard noise in the duct, as if the cable was coming through.

The senior technician had previously suggested that they obtain an uptake reel from another truck and install it on the spindle of their trailer. If used, the reel would have pulled the tape, assisting the workers. Around 10:30, the victim, working outside, requested help from his colleague. When the co-worker walked outside, he heard the cable reel trailer running. The victim told his colleague to "Grab the end and walk it." He wanted him to grab the tape and pull it by hand. The co-worker was about to grab the tape when he saw that the victim's hand was caught in the tape. He had wrapped the tape around the spinning, protruding spindle on the shaft of the machine, apparently to use it as an uptake reel and then gotten his hand caught. His colleague tried to release him but couldn't. The victim's clothing also became entangled. The frantic co-worker wanted to cut the tape to free the victim but was unable to reach his shears since they were in his

pocket and under his outer tyvek suit, used to protect against sludge found in the manholes. Since he had seen the machine used only as a trailer, he was unaware that activating a lever on the back of the machine would have reversed the direction of the spindle rotation. There was no emergency stop button. He deenergized the machine off by turning it off at the ignition and used his radio to call for help. The other workers responded immediately. They were unable to free the victim. Police and rescue personnel assisted but the victim was pronounced dead at the scene at 12 noon.

**CAUSE OF DEATH:** The medical examiner determined that death was caused by “asphyxia caused by neck compression.”

### ***RECOMMENDATIONS/DISCUSSIONS***

*Recommendation # 1:* The employer should consider appointing one worker in each crew as a supervisor.

*Discussion:* Without one worker designated as a crew chief or supervisor, there is no one who is responsible for taking over or making decisions in the event of a problem at the work site. Reportedly, a few years ago three man crews were cut back to two man crews and the supervisor was eliminated. It is not possible to always pair a less experienced worker with a more experienced one. It is recommended that the employer evaluate work situations and determine which situations warrant designating one worker as the crew supervisor or foreman. The supervisor would be a worker with extensive experience and skill and be able to direct the manner in which the job is done.

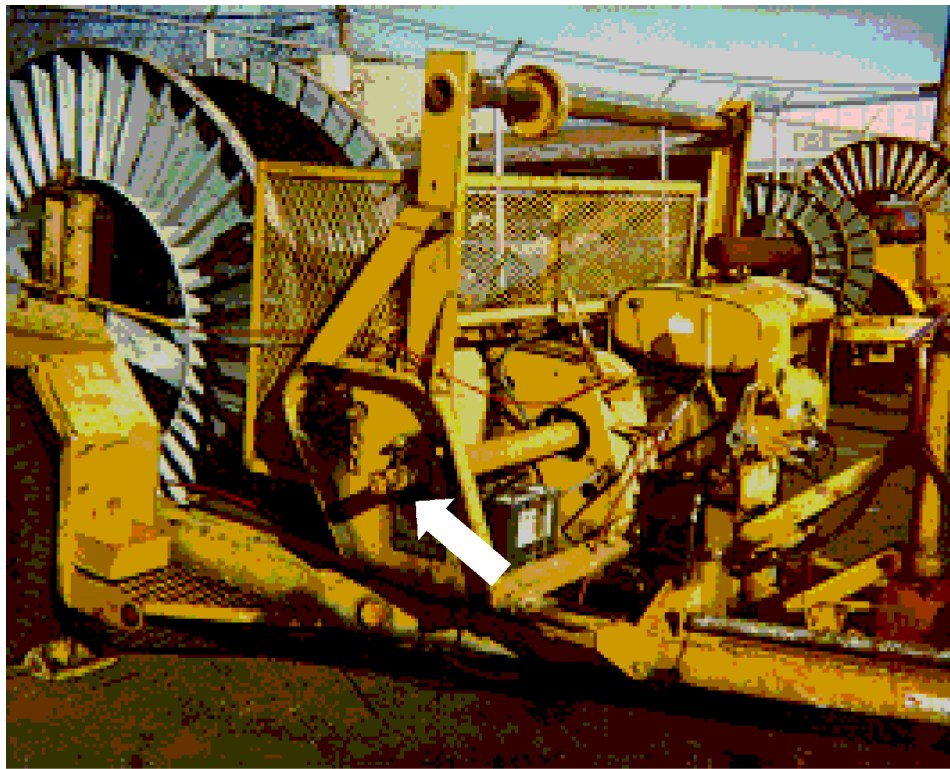
*Recommendation #2:* All machines and equipment should be inspected for unguarded hazards and retrofitted with machine safeguards.

*Discussion:* The unprotected, rotating, auxiliary shaft on the 20 year-old cable reel trailer presented a danger to anyone working close to the machine whenever a reel was not mounted on the shaft. Since it protruded 5 ½ inches and rotated, it was possible for clothing or body parts to become entangled on the spinning shaft. The manufacturer made changes in newer models but, according to the employer, there was no notice sent by the manufacturer or dealers to owners of older machines to update them on the alterations. The manufacturer developed a removable guard for the spindle shaft and an emergency shut off switch. The removable cover would not have covered the protruding shaft but would have prevented getting a hand caught on the main shaft since the cover would stop rotating when touched. The hazard of the unprotected rotating shaft is addressed under OSHA regulation CFR 1926.307, mechanical power-transmission apparatus.

The employer has surveyed the company locations and determined that the company owned 53 cable reel trailers. They have begun the process of inspecting and updating the trailers. The company has been installing removable guards on the shafts and also safety stop devices.

*Recommendation #3:* The employer should include hazard recognition in the employees' training.

*Discussion:* Although the company had an extensive safety and training program, workers should be taught to recognize unsafe tasks, equipment, and work practices. Since training cannot cover every situation in which a worker may find himself, this type of knowledge would be applicable to any usual or unusual situation.



97NJ-114-01  
Cable Reel Trailer  
Unguarded Rotating Shaft

***REFERENCE***

Code of Federal Regulations, 1926, U.S. Government Printing Office, Washington D.C.



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**ASSESSMENT AND CONTROL EVALUATION (FACE) PROJECT**  
Investigation # 97-NJ-114-01

Staff members of the New Jersey Department of Health and Senior Services, Occupational Disease and Injury Services, perform FACE investigations when there is a report of a work-related fatal fall or machine-related incident. The goal of the FACE Program is to prevent future incidents by studying and identifying the risk factors that contribute to workplace fatalities, by recommending intervention strategies, and by disseminating information to employers and employees. All NJ FACE data are reported to NIOSH for trend analysis on a national basis. All identifiers are removed from the FACE reports and other data to protect the confidentiality of those who participate in the program.

NIOSH funded state-based FACE Programs include: Alaska, California, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, New Jersey, Ohio, Oklahoma, Texas, Washington, West Virginia, and Wisconsin.

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