CRANE'S CHRONICLES

SAFETY IS NEWSWORTHY

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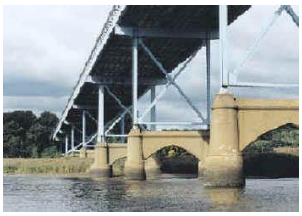
The purpose of this newsletter is to help spread the word concerning good safety habits. I will highlight accident reports regularly in the hopes that we can all learn from others mistakes.

From my experience many mistakes happen to people that never realized that what they were doing was dangerous and may have caused injuries to someone else.

Index:

Crane accident at Sikorsky Bridge

STRATFORD (AP) -- A fatal crane accident at the Sikorsky Memorial Bridge may have been caused by a flaw in the demolition plan, according to a state police investigator and reported Friday by the New Haven Register.



(Continued on pg.3)

Crane tips over at new Cooper River bridge site

A crane toppled over on the new Cooper River bridge construction site Tuesday after a worker repositioned the heavy

Piece of equipment without ensuring it was properly balanced. (Continued on pg. 4)

Worker killed at Carter-Finley

A construction accident at N.C. State's football stadium killed

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one man and injured two others on Monday. The men

(From Pg 1)

were working on the new press box for Carter-Finley Stadium.

Work crews were busy at Carter-Finley Stadium just before noon.

"They were actually working on raising the columns with rebar to pour for concrete on our new press box here at the stadium," NCSU Police Sgt. Jon Barnwell said.

Juan Zepeda, 28, and two other men were attached to the top of a metal structure called a rebar column. They were getting the metal ready to hold new concrete.

"The rebar column started giving way and eventually came to the ground," Barnwell said. "As it fell over, they were attached to the physical structure, so they went with it."

"There are OSHA regulations that all construction companies have to follow," Barnwell said. "At this time, it's still under investigation as to whether anything was met, but we're not seeing anything that wasn't meeting OSHA standards at this time."

Authorities were able to release Juan Zepeda's name much earlier than normal in a construction accident because the notification of next of kin took place very quickly. His one relative, a brother, was also working at the construction site.

"Once we look at the investigation, as long as all the regulations are being met, they should be able to get back up and running in a short time," Barnwell said.

Emergency crews took the injured workers to Rex Hospital. N.C. State Police said the investigation continues.

Worker shocked by power line

A man working on a gas station sign in Florence was injured Tuesday afternoon after apparently bumping his head on a power line.

Linwood Jackson, 54, of Tuscaloosa, was working in a bucket truck erecting a sign at a Parade gas station, 844 Florence Blvd. just after 2 p.m. He absorbed 2,400 volts when he hit the line.

Jackson was taken to Eliza Coffee Memorial Hospital where he is listed in fair condition.

Date farm worker electrocuted after ladder touches power line

The Desert Sun
March 17th, 2004

Authorities are investigating the death of a Thermal man who was electrocuted Tuesday on a date farm.

Gerardo Olvera-Hernandez, a 23-year-old date farm worker, died early Tuesday after he touched a ladder to a high-voltage power line at 84-301 Avenue 66, the Riverside County Coroner reported.

A spokeswoman for IID Energy said the date ranch was called Rancho Vecerra.

Olvera-Hernandez reportedly crossed under a 7.2-kilovolt power line while carrying a 32-foot metal ladder in the upright position while pollinating date trees. He was electrocuted when the ladder touched the power line.

He was taken to John F. Kennedy Memorial Hospital in Indio where he died at 8:10 a.m.

Rosa Maria Gonzales, spokeswoman for IID Energy, said the voltage that surged through the man would light up roughly 7,200 light bulbs.

The incident was ruled an accident by Riverside County Sheriff's Department. California Occupational Safety and Health Administration officials are investigating safety training at the ranch following the accident.

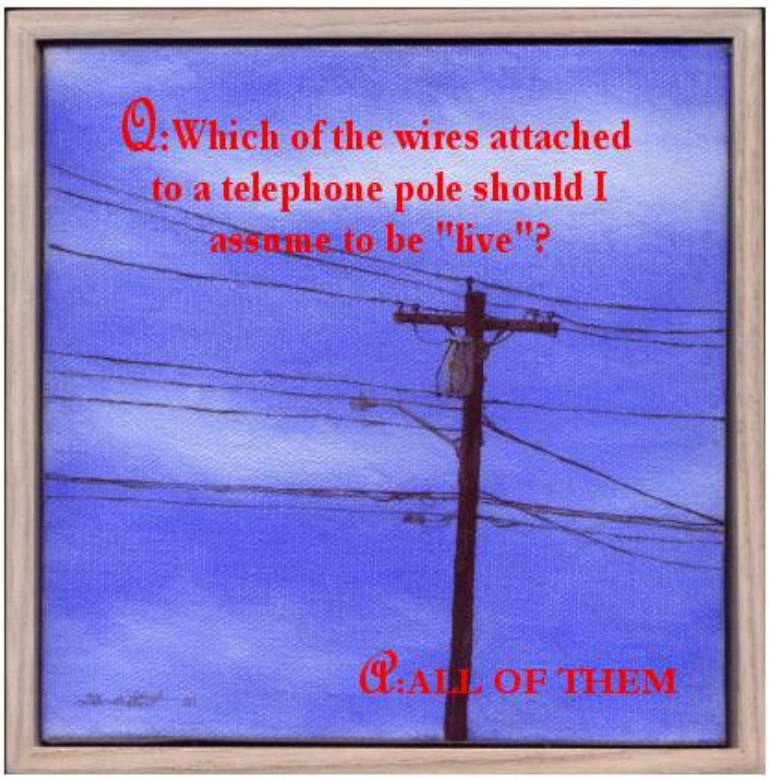
"We don't look at who's to blame," said Dean Fryer, a Cal-OSHA spokesman. "We strictly focus on whether violations have occurred." Fryer said investigators will conduct interviews of other employees to determine whether they were properly trained to work around power lines.

Fryer said the investigation could take up to two or three months. He said repercussions, if any, could vary from $200 to $25,000 in fines depending whether violations are found and the severity of violations.

According to the U.S. Department of Labor, Bureau of Labor Statistics, 122 people died on the job as a result of contact with overhead power lines in 2002.

(Sikorsky from pg.1)

Charles Jordan, 60, of Satsuma, Ala., died Feb. 17 when the crane he was operating toppled off a barge into the Housatonic River under the weight of a beam that was nearly twice as heavy as the crane was designed to hold, state police say.



The state medical examiner ruled the death accidental and caused by multiple blunt traumatic injuries.

State police Sgt. Scott Llewellyn said the beam that was being removed by two cranes, one of which was Jordan's, weighed about 75 tons. The two cranes were rated to lift about 40 tons each, or a total of about 80 tons, Llewellyn said.

"We're concerned over the beam itself that was being picked up-that perhaps it was incorrectly picked up," Llewellyn said. "Something went drastically wrong."

Had the removal gone as planned, the two cranes together would have lifted the beam and set it down. State police believe the beam bent as it was lifted, leaving Jordan's crane holding the beam, Llewellyn said. That crane alone couldn't handle that type of weight. The two cranes working together could," he said. "One crane ended up supporting the entire weight."

Demolition plans were the responsibility of contractor Balfour Beatty, Llewellyn said.

Bill Hightower, a spokesman for Balfour Beatty, told the newspaper he could not comment on the state police preliminary findings until official notification is received.

"We have a good safety record and we're proud of our safety record, and we're going to continue to cooperate with the investigation," he said.

The company has been cited for violations in other incidents, including one on the project in October 2001 when an excavator lifting a piece of equipment fell into the river, according to the U.S. Occupational Safety and Health Administration.

No one was seriously injured. Balfour was fined $2,500 for exceeding the limits of the equipment and not providing stairways or ladders at all personnel points of access.

The state is replacing the steel-grated bridge, which connected the Merritt and Wilbur Cross parkways in Stratford, with an 1,800-foot, solid-deck span.

The DOT began plotting demolition and removal of the old bridge in 1996 and started construction in 1999. The new bridge opened to traffic in November. That bridge is to be widened once the old bridge is torn town. The $96 million project is expected to be completed by 2005.

(From pg1 Cooper)

No one was injured or hurt although it landed within feet of motorists traveling westbound on the Interstate 26.

The crane, which tipped over about 7 a.m. near the Interstate 26 overpass on Romney Street, probably fell because only two of its four outriggers were extended and attached to the ground, said Wade Watson, project manager of the $632 million bridge project with Palmetto Bridge Constructors. Like kickstands on a bicycle, outriggers give a crane balance and help keep it grounded when lifting heavy loads.

The crane's operator was moving the crane to make room for a fuel truck to fill up the crane's gas tank. The operator was starting his fourth and final day on the job of lifting material for the construction of new interstate ramps leading to the eight-lane bridge.

"We believe he was swinging the boom (the extendable-lifting mechanism) around to get the fuel truck to the crane's tank. But I haven't heard it yet from the operator's mouth," Watson said. "The movement caused the crane to lose its point of gravity, and it tipped over."

Thomas Berth, an accredited crane inspector with the U.S. Department of Labor's Office of Occupational Safety and Health, said the accident could have been avoided.

"One of the main things you do is put the outriggers down on a crane. That is standard procedure. It is common sense," Berth said.

The crane operator is employed by MAXIM Crane Works, a subcontractor frequently hired for lift work by PBC, Watson said.

"The operator has been running cranes for years," he said. "MAXIM is a top-notch outfit. We have been very happy with them on the job. They are one of our main guys."

A spokesperson with MAXIM would not comment on the accident Tuesday, but Watson said PBC and MAXIM are investigating.

MAXIM is a national crane rental company with offices in Columbia and Charleston. According to state OSHA records, MAXIM received $3,000 in fines in February 2003 for improperly lifting materials on a work site in Columbia.

Jim Knight, a spokesman with the S.C. Department of Labor, Licensing and Regulation, said the Office of Occupational Safety and Health would not investigate the accident because no one was injured. The state automatically investigates accidents when someone is killed or when three or more workers are injured and spend the night in the hospital.

03/10/04

Second Construction Worker Dies

Plant McIntosh

Tragedy has struck twice at an Effingham County construction site. This morning, Johhny Boyette of Bonafey, Florida, fell to his death on the job. That's the second time in less than two weeks that a construction worker has died at Plant McIntosh. WG Yates and Sons Construction has suspended all work at the site until it completes an investigation.

Officials aren't saying how Boyette died, but WTOC has learned the man basket he was in tipped over. Two weeks ago, the same thing happened to Joe Bethanie, who plunged 40 feet to his death. We spoke with WG Yates and Sons vice President Kenny Bush. He says he was shocked by the recent deaths.

"We are a company that prides ourselves in our safety record," he said. "We've gone 40 years without a work-related death. Now we have two in two weeks. We are taking this very seriously." That's why all work at Plant McIntosh is suspended until an investigation is complete.

Meddy Settles is part of Local 256, a union member who tried to get local workers jobs at Plant McIntosh when construction began last year. he's now questioning the safety record and wonders if workers are being properly trained. "Two deaths in two weeks, there has to be some problems with safety concerns on that job," he said. "If that's not the problem, they are not doing enough safety training on the job."

But according to Bush, all workers at their site are properly trained. "We have people with OSHA training," he said. "We go through safety orientation."

But Settles says there is no excuse for these two deaths. "A hundred years ago, it might have been a freak accident, but every man should be able to go to work and come home to his family safe and secure," he said.

Yates Construction says at this time its main concern is to take care of the family. They hope to have the investigation completed in the next few days.

Bridge worker has toes severed

VERONA (March 15, 2004): A construction worker whose toes were severed during an accident at the new Waldo-Hancock Bridge site in Verona Saturday was released from a Portland hospital Sunday and is recuperating at home.

Robert Hull, 48, of Alna, was maneuvering a piece of the rebar into the foundation hole for one of the bridge pilings when it landed on his left foot.

Dottie Hutchins, a spokesperson for Cianbro, a major contractor on the bridge project, said Hull's toes were reattatched and he is expected to return to work in a few weeks. "The only thing he lose was some flesh from his big toe," she said.

Hull works for Stresscon, an Arizone-based company that specializes in rebar work, Hutchins said. The bridge is a joint project of Cianbro and Reed & Reed of Woolwich

According to Chief Deputy Bob Keating of the Waldo County Sheriff's Department, three other workers in the hole helped Hull climb to safety. A Stockton Springs ambulance transported him to Waldo County General Hospital.

The work site was shut down for the day following the accident, Keating said.

Beam Falls On Worker At Highway 55 Construction Site

POSTED: 2:19 pm EST March 22, 2004
HOLLY SPRINGS, N.C. -- A construction worker moving a beam on a Holly Springs job site was killed when a cable that was holding the beam snapped. The beam fell on the worker, killing him instantly. The accident occurred at Old Adams Road and South Main Street. The construction being done was related to the Highway 55 bypass project.

The worker died about 1 p.m., about an hour after a fatal construction accident at Carter-Finley Stadium in Raleigh.

Barbershop Accidentally Demolished

A barbershop fell victim to a wrecking ball by accident Tuesday. Neighbors say the small-town barbershop in Michigantown, close to Frankfort, was not part of the demolition plans when the wrecking ball was released.

Worker's pursuing a demolition project knocked down an older brick building Tuesday afternoon, then clobbered Ralph Webb's adjoining barbershop by accident.

"I was out of the shop while they were doing the demolition, and all of a sudden she just went right down on my shop and pancaked it," says Ralph Webb, owner.

"The crew swung the arm too fast and it hit one of the tall stories of bricks and it just collapsed all over the front of it," says witness Kegan Crafton.

The barbershop had been a fixture on Michigantown's Main Street for almost 50 years.

"Luckily, we got out one of his oldest belongings, a 100 year old saddle, and a wooden Indian," says Crafton.

Webb searched through the rubble to pick up his tools and went back to cutting hair Thursday in a space next door to his old shop.

"There were a lot of people down there when it happened that night. People were carrying stuff out," says neighbor Sara Cline.

Webb says he plans to rebuild the barbershop. His neighbors say it will be only a matter of time.

The contractor in charge of the demolition is already making amends. He's helping Webb to stay in business while the re-building takes place.

No one was hurt in Tuesday's demolition.

Road Safety is the theme of this year's annual World Health Day celebration

Road Safety is the theme of this year's annual World Health Day celebration, led by the World Health Organization. Each year, motor vehicle crashes claim the lives of more than 44,000 people in the United States and are the leading cause of death among people ages 1 to 34 years. To portray such crashes, print and television media focus on wrecked cars or ambulances scurrying away injured victims--some fatal. These images don't illustrate injury prevention behaviors. CDC's Injury Center is now offering our partners royalty-free injury prevention images that model proper injury prevention techniques. These images will show children properly restrained in the back seat, drivers and passengers wearing safety belts, pedestrians safely crossing the street, and others. The photos are available on CD-ROM; charts of leading causes of death and injury are available for download. On April 7, events will be held worldwide to raise awareness about road traffic injuries and public health approaches to prevention. In the United States, the U.S. Department of Health and Human Services (DHHS), the U.S. Department of Transportation (DOT), and other partner organizations are coordinating events to bring

attention to the problem of motor vehicle deaths and injuries in the United States and around the world. Each year, road traffic injuries kill more than a million people around the world and injure tens of millions more. SAFTENG will participate in this effort with our Workzone Shockers and GRRRRRRR is putting together one of his world-class presentations with new photos)

One worker dies, another injured in tunnel accident

03/18/2004

Associated Press

One state transportation worker was killed and another injured early Thursday in an accident at the Hampton Roads Bridge Tunnel, authorities said.

The accident happened shortly after 12:30 a.m., Virginia Department of Transportation spokesman Jeff Caldwell said.

Both workers suffered head injuries after hitting the top of the mouth of the tunnel while sitting backwards in the rear of a work vehicle, a converted dump truck with a platform in the back. Charles Brinkley, the injured worker, was treated at a local hospital and released, Caldwell said.

VDOT identified Paul Thurber, 48, of Norfolk, as the worker killed.

"We don't know what caused the incident at this point," Caldwell said. "We're going to try to determine what the circumstances were so that something like this never happens again."

The workers were part of a crew replacing lights in the eastbound tunnel. They had exited that tunnel and had just turned into the entrance of the westbound tunnel when the accident occurred, he said.

VDOT, state police and the Occupational Safety and Health Administration are investigating.

Cranes Question Corner

Q: **Are wallboard trucks, log loaders and form loaders considered cranes?**

A: Yes. There's no question about it. They all fit the traditional definition of a crane as per OSHA 1910.180(a)(3) A "truck crane" consists of a rotating superstructure with powerplant, operating machinery and boom, mounted on an automotive truck equipped with a powerplant for travel. Its function is to hoist and swing loads at various radii.

Q: **What is "dynamic" loading?**

A: The simplest description of dynamic loading is the effect felt by the weight of the load times the speed of it. Accidents created by dynamic loading probably follow this logic. You're lifting 10,000 lbs. It's 80% of your cranes capacity and the wind is making it sway 30' side to side. You are now exerting more than 10,000 lbs of stress on the boom (dynamically) and even a great mathematician would need time to calculate if you're still in your chart. To witness this effect at home, go down to the basement a grab one of your heaviest dumbbells. Wipe the dust of it, lift it up in one hand and stand up straight. (Quit moaning, you can do it!!). Now try standing up straight while swinging it side-to-side, then front to back. See how much heavier it gets? That's "dynamic loading".

Q: I just bought a new crane. Does it need to be inspected?

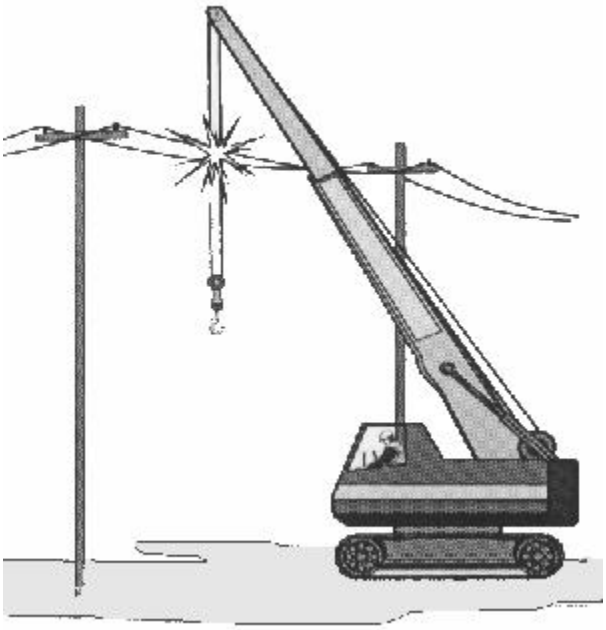
A: Yes. I've seen new cranes fail inspection. Refer to OSHA 1910.180 (d)(1)"Initial inspection." Prior to initial use all new and altered cranes shall be inspected to insure compliance with provisions of this section.

If you have any questions that you want to get answered, fax or email them to me. My fax and email are listed on the newsletter. I appreciate any input.
Jay

Preventing Electrocutions of Crane Operators and Crew Members Working Near Overhead Power Lines

The National Institute for Occupational Safety and Health (NIOSH) requests assistance in preventing electrocutions of crane operators and crew members working near overhead power lines. Recent NIOSH investigations suggest that employers, supervisors, and workers may not be fully aware of the hazards of operating cranes near overhead power lines or may not implement the proper safety procedures for controlling these hazards. This Alert describes five cases (six electrocutions) that resulted from such hazards and makes recommendations for preventing similar incidents. The Alert updates a previous NIOSH Alert published in July 1985 [NIOSH 1985].

The recommendations in this Alert should be followed by all employers, managers, supervisors, and workers in companies that use cranes or similar boomed vehicles. NIOSH requests that the following individuals and organizations bring this Alert to the attention of workers who are at risk: editors of trade journals, safety and health officials, construction companies, unions, suppliers and manufacturers of building materials, crane manufacturers, electric utilities, and others who use cranes or boomed vehicles.



Workers are killed each year when cranes contact overhead power lines.

NTOF Data

Data from the NIOSH National Traumatic Occupational Fatalities (NTOF) Surveillance System indicate that electrocutions accounted for approximately 450 (7%) of the 6,400 work-related deaths from injury that occurred annually in the United States during the period 1980-89 [NIOSH 1993a]. Each year an average of 15 electrocutions were caused by contact between cranes or similar boomed vehicles and energized, overhead power lines. The actual number of workers who died from crane contact with energized power lines is higher than reported by NTOF because methods for collecting and reporting these data tend to underestimate the total number of deaths [NIOSH 1993a]. More than half of these crane-related electrocutions occurred in the construction industry.

FACE Data

From 1982 through 1994, NIOSH conducted 226 onsite investigations of work-related electrocutions under the Fatality Assessment and Control Evaluation (FACE) Program. Twenty-nine (13%) of these incidents (which resulted in 31 fatalities) involved crane contact with overhead power lines. Nearly half of the incidents occurred in the construction industry. Because the FACE investigations were conducted in only 16 states, these fatalities represent only a portion of the crane-related electrocutions during the period 1982-94.

OSHA Data

A study conducted by the Occupational Safety and Health Administration (OSHA) showed that 377 (65%) of 580 work-related electrocutions occurred in the construction industry during the period 1985-89 [OSHA 1990]. Nearly 30% (113) of these electrocutions involved cranes.

CURRENT STANDARDS

OSHA Regulations

Current OSHA regulations require employers to take precautions when cranes and boomed vehicles are operated near overhead power lines. Any overhead power line shall be considered energized unless the owner of the line or the electric utility company indicates that it has been de-energized and it is visibly grounded [29 CFR 1926.550 (a)(15)(vi)]. The OSHA regulations are summarized as follows:

Employers shall ensure that overhead power lines are de-energized or separated from the crane and its load by implementing one or more of the following procedures:

De-energize and visibly ground electrical distribution and transmission lines [29 CFR 1910.333(c)(3); 29 CFR 1926.550(a)(15)]

Use independent insulated barriers to prevent physical contact with the power lines [29 CFR 1910.333(c)(3); 29 CFR 1926. 550(a)(15)]

Maintain minimum clearance between energized power lines and the crane and its load [29 CFR 1910.333(c)(3)(iii); 29 CFR 1926.550(a)(15)(i), (ii), (iii)].

Where it is difficult for the crane operator to maintain clearance by visual means, a person shall be designated to observe the clearance between the energized power lines and the crane and its load [29 CFR 1926.550(a)(15)(iv)].

The use of cage-type boom guards, insulating links, or proximity warning devices shall not alter the need to follow required precautions [29 CFR 1926.550 (a)(15)(v)]. These devices are not a substitute for de-energizing and grounding lines or maintaining safe line clearances.

ANSI Standard

The American National Standards Institute (ANSI) has published a standard for mobile and locomotive cranes that includes operation near overhead power lines [ANSI 1994]. This consensus standard (B30.5-1994) contains guidelines for preventing contact between cranes and electrical energy. The standard addresses the following issues:

- Considering any overhead wire to be energized unless and until the person owning the line or the utility authorities verify that the line is not energized
- De-energizing power lines before work begins, erecting insulated barriers to prevent physical contact with the energized lines, or maintaining safe clearance between the energized lines and boomed equipment
- Limitations of cage-type boom guards, insulating links, and proximity warning devices
- Notifying line owners before work is performed near power lines
- Posting warnings on cranes cautioning the operators to maintain safe clearance between energized power lines and their equipment

CSA Recommendations

The Construction Safety Association of Ontario, Canada (CSA) recommends safe work practices in addition to those addressed in the OSHA and ANSI standards [CSA 1982]. These recommendations include the following.

Work Practices

- Operate the crane at a slower-than-normal rate in the vicinity of power lines.
- Exercise caution near long spans of overhead power lines, since wind can cause the power lines to sway laterally and reduce the clearance between the crane and the power line.
- Mark safe routes where cranes must repeatedly travel beneath power lines.
- Exercise caution when travelling over uneven ground that could cause the crane to weave or bob into power lines.
- Keep all personnel well away from the crane whenever it is close to power lines.
- Prohibit persons from touching the crane or its load until a signal person indicates that it is safe to do so.

The CSA recommendations also address the limitations of proximity warning devices, hook insulators, insulating boom guards, swing limit stops, nonconductive taglines, ground rods, and similar devices for protection against electrical hazards.

Procedures to Follow If Contact Occurs

To protect against electrical shock injury in the event of contact between a crane and an energized line, the CSA recommends the following:

- The crane operator should remain inside the cab.
- All other personnel should keep away from the crane, ropes, and load, since the ground around the machine might be energized.
- The crane operator should try to remove the crane from contact by moving it in the reverse direction from that which caused the contact.
- If the crane cannot be moved away from contact, the operator should remain inside cab until the lines have been de-ener gized.

CASE REPORTS

The five cases presented here were investigated by the NIOSH FACE Program between March 1990 and March 1993.

Case No. 1--One Death

On March 1, 1990, a 29-year-old worker was electrocuted when he pushed the crane cable on a 1-yard cement bucket into a 7,200-volt power line. The victim was a member of a crew that was constructing the back concrete wall of an underground water-holding tank at a sewage treatment plant. Before work on the tank began, the company safety director made sure that insulated line hoses were placed over sections of the power line near the jobsite and that a safe clearance zone was marked off for arriving cement trucks to use for loading their cement buckets.

After the wall was poured, the driver of the cement truck cleaned the loading chute on his truck with a water hose mounted on the truck. As he began to pull away, the crew supervisor yelled to him, asking if the crew could use his water hose to wash out the cement bucket suspended from the crane. The driver stopped the truck under the power line and the crane operator (not realizing that the truck had been moved) swung the boom to position the bucket behind the truck. The victim grasped the handle of the bucket door and pushed down to open it, bringing the crane cable into contact with the power line. The victim provided a path to ground and was electrocuted [NIOSH 1990b].

Case No. 2--One Death

On August 11, 1990, a 33-year-old well driller was electrocuted when a metal pipe lifted by a truck-mounted crane contacted a 12,000-volt overhead power line. The victim and a coworker were repairing a submersible pump for a water well at a private residence. The well was located in a pasture with three parallel power lines overhead. One of the power lines passed directly over the well (32 feet above the ground). On the day of the incident, the victim positioned the truck-mounted crane beneath the power line. Using a handheld remote-control pendant, the victim fully extended the end of the boom 36 feet above the ground. The crane cable was attached to a 1-inch-diameter galvanized pipe that ran to the pump inside the well. As the victim raised the pipe, it contacted the power line directly above the well, energizing the crane and the handheld remote-control pendant. The victim provided a path to ground and was electrocuted [NIOSH 1990c].

Case No. 3--One Death

On August 22, 1990, a 24-year-old foreman for a telecommunications company was electrocuted when he grabbed the door handle on a truck-mounted crane whose boom was in contact with a 7,200-volt overhead power line. The foreman and three other workers (a lineman, a cable splicer, and a laborer) were attempting to remove four poles that had supported a billboard. The poles stood 20 feet high and were buried 5 feet in the ground. They were located 15 feet away from (and parallel to) the power line. To remove the poles, the lineman positioned the crane directly under the power line. He controlled the crane boom while standing on the ground using rubber-coated hand controls mounted on the back of the truck. The poles were removed by hooking the crane boom cable around the middle of each pole and vertically pulling each pole out of the ground. While the workers were pulling out the third pole, the end of the boom contacted the overhead power line. The laborer (who was working in the back of the truck) noticed that the lineman was being shocked and was unable to let go of the hand control. The laborer kicked the lineman in the chest and the lineman fell unconscious to the ground. He revived without assistance about 3 minutes later with electrical burns to his left hand. However, the crane boom remained in contact with the power line, the truck tires ignited, and the truck began to burn. When the foreman noticed that the boom remained in contact with the power line, he tried to open one of the truck doors (presumably to move the truck). When his hand contacted the door handle, he provided a path to ground and was electrocuted [NIOSH 1990a].

Case No. 4--One Death

On June 24, 1991, a 37-year-old construction laborer was electrocuted while pulling a wire rope attached to a crane cable toward a load. The choker was to be connected to a steel roof joist that was to be lifted 150 feet across the roof of a one-story school and set in place. The cab of the crane was positioned 11 feet 6 inches from a 7200-volt power line. After a previous roof joist had been set in place, the crane operator swung the crane boom and cable back toward the victim, who grabbed the choker in his left hand. With his right hand, he held onto a steel rod that had been driven into the ground nearby. At this point, the momentum of the swinging crane apparently caused the crane cable to contact the power line. The electrical current passed across the victim's chest and through the steel rod to ground, causing his electrocution [NIOSH 1991].

Case No. 5--Two Deaths

On March 31, 1993, a 20-year-old male truck driver and his 70-year-old male employer (the company president) were electrocuted when the boom of a truck-mounted crane contacted a 7,200-volt conductor of an overhead power line. The incident occurred while the driver was unloading concrete blocks at a residential construction site. The driver had backed the truck up the steeply sloped driveway under a power line at the site and was using the crane to unload a cube of concrete blocks. The company president and a masonry contractor watched as the driver operated the crane by a handheld remote-control unit. The driver was having difficulty unloading the blocks because the truck was parked at a steep angle. While all three men watched the blocks, the tip of the crane boom contacted a conductor of the overhead power line and completed a path to ground through the truck, the remote control unit, and the driver. The company president attempted to render assistance and apparently contacted the truck, completing a path to ground through his body. He died on the scene. The truck driver was airlifted to a nearby burn center where he later died as a result of electrical burns [NIOSH 1993b].

CONCLUSIONS

These case reports indicate that some crane operators, their employers and supervisors, and others who work around cranes may not be fully aware of the hazards of operating cranes near overhead power lines or may not implement the proper safety procedures for controlling these hazards.

RECOMMENDATIONS

NIOSH recommends that employers take the following measures to protect workers and operators of cranes and other boomed vehicles from contacting energized overhead power lines.

Comply with OSHA Regulations

Train workers to comply with current OSHA regulations. These regulations require workers and employers to consider all overhead power lines to be energized until (1) the owner of the lines or the electric utility indicates that they are not energized, and (2) they have been visibly grounded [29 CFR 1910.333 (c)(3); 29 CFR 1926.550(a)(15)].

Employers shall ensure that overhead power lines are de-energized or separated from the crane and its load by implementing one or more of the following [29 CFR 1910.333(c)(3); 29 CFR 1926.550(a)(15)]:

De-energize and visibly ground electrical distribution and

transmission lines at the point of work

Use insulated barriers that are not a part of the crane to prevent contact with the lines

If the power lines are not de-energized, operate cranes in the area ONLY if a safe minimum clearance is maintained as follows:

At least 10 feet for lines rated 50 kilovolts or below

At least 10 feet plus 0.4 inch for each kilovolt above 50 kilovolts; or maintain the length of the line insulator (but never less than 10 feet)

Where it is difficult for the crane operator to maintain safe clearance by visual means, designate a person to observe the clearance and to give immediate warning when the crane approaches the limits of safe clearance [29 CFR 1926.550(a) (15)(iv)].

Do not use cage-type boom guards, insulating links, or proximity warning devices as a substitute for de-energizing and grounding lines or maintaining safe clearance [29 CFR 1926.550(a)(15)(v)].

Follow ANSI Guidelines

Train workers to follow ANSI guidelines for operating cranes near overhead power lines (ANSI Standard B30.5-1994, 5-3.4.5)[ANSI 1994]. These guidelines recommend posting signs at the operator's station and on the outside of the crane warning that electrocution may occur if workers do not maintain safe minimum clearance that equals or exceeds OSHA requirements as follows:

Power line voltage phase to phase (kV)	Minimum safe clearance (feet)
50 or below	10
Above 50 to 200	15
Above 200 to 350	20
Above 350 to 500	25
Above 500 to 750	35
Above 750 to 1,000	45

Notify Power Line Owners

Before beginning operations near electrical lines, notify the owners of the lines or their authorized representatives and provide them with all pertinent information: type of equipment (including length of boom) and date, time, and

type of work involved. Request the cooperation of the owner to de-energize and ground the lines or to help provide insulated barriers. NIOSH encourages employers to consider de-energization (where possible) as the primary means of preventing injury from contact between cranes and power lines.

Develop Safety Programs

Develop and implement written safety programs to help workers recognize and control the hazards of crane contact with overhead power lines.

Evaluate Jobsites

Evaluate jobsites before beginning work to determine the safest areas for material storage, the best placement for machinery during operations, and the size and type of machinery to be used.

Know the location and voltage of all overhead power lines at the jobsite before operating or working with any crane.

Research has shown that it is difficult to judge accurately the distance to an overhead object such as a power line [Middendorf 1978]. Therefore, NIOSH recommends that no other duties or responsibilities be assigned when workers are designated to observe clearance during crane movement or operation.

Evaluate Alternative Work Methods

Evaluate alternative work methods that do not require the use of cranes. For example, it may be possible to use concrete pumping trucks instead of crane-suspended buckets for placing concrete near overhead power lines. Alternative methods should be carefully evaluated to ensure that they do not introduce new hazards into the workplace.

Train Workers

Ensure that workers assigned to operate cranes and other boomed vehicles are specifically trained in safe operating procedures. Also ensure that workers are trained (1) to understand the limitations of such devices as boom guards, insulated lines, ground rods, nonconductive links, and proximity warning devices, and (2) to recognize that these devices are not substitutes for de-energizing and grounding lines or maintaining safe clearance. Workers should also be trained to recognize the hazards and use proper techniques when rescuing coworkers or recovering equipment in contact with electrical energy. CSA guidelines list techniques that can be used when equipment contacts energized power lines [CSA 1982] (see Current Standards in this Alert).

All employers and workers should be trained in cardiopulmonary resuscitation (CPR).

Call for Help

Ensure that workers are provided with a quick means of summoning assistance when an emergency occurs.

Develop Safer Equipment

Encourage the manufacturers of cranes and other boomed vehicles to consider developing truck-mounted cranes with electrically isolated crane control systems, such as those that use fiber optic conductors to transmit control signals.

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