31 Year-old Fire Chief Electrocuted in North Carolina

Death in the Line of Duty...A summary of a NIOSH fire fighter fatality investigation

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Introduction:

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR) is currently conducting the Fatal Accident Circumstances and Epidemiology (FACE) Project, which is focusing primarily upon selected electrical-related and confined space-related fatalities. The purpose of the FACE program is to identify and rank factors that influence the risk of fatal injuries for selected employees.

On November 15, 1986, the chief of a volunteer fire department was electrocuted while attempting to extricate an injured person from a vehicle involved in an accident. He was holding a winch cable which contacted downed, energized power lines.

Contacts/Activities:

Officials of the Occupational Safety and Health Program for the State of North Carolina notified DSR concerning this fatality and requested technical assistance. This case has been included in the FACE Project. Two research industrial hygienists from DSR met with the fire chief, interviewed comparison workers and a surrogate for the victim, conducted a site visit, and photographed the accident site.

Background/Overview of Employer's Safety Program:

The employer is a volunteer fire department with a staff of two full-time paid, two part-time paid, and 40 volunteer fireman. Although the victim was on volunteer status for this fire department, he was also a full-time paid fireman for the nearby city fire department.

The volunteer fire department does not have a written safety program; however, a fire department handbook which is given to all department personnel does outline required personal protective equipment for firemen responding to an emergency. New department members serve a six month probationary period during which time they must complete a 52-hour fireman training course. In addition, the department presents three-hours of training each week that department members are encouraged to attend. A major part of the training involves emergency response drills, the proper used of personal protective equipment, rescue techniques, and on-the-job employee safety. The fire chief was responsible for the management of this on-going training program.

Synopsis of Events:

On November 15, 1986, at 7:20 p.m. the chief of a volunteer fire department (the victim) and several other fireman responded to a power line transformer fire. At 7:22 p.m. while still at the site of the transformer fire, the fire department received another emergency call concerning an automobile accident. A vehicle has gone off the road and struck a utility pole carrying a 7200 volt, three-phase power line. The force of the collision broke the pole off at ground level which caused one conductor to fall to the ground and two other conductors to sag until they were approximately three to five feet above the ground. An injured passenger remained pinned inside the vehicle. The ground was wet as it had rained previously that day. The chief of the fire department (who was on volunteer status) and another volunteer fireman arrived at the accident site. They were joined by the engine company and rescue unit from the fire department and an ambulance; a total of eight fire department and rescue personnel. All fire department personnel except the fire chief, who had assumed the role of fire ground commander, and two other firemen were wearing turnout gear which included leather gloves and rubber boots.

The vehicle involved in the accident was on its side approximately two feet from the downed conductors. The conductors were between the overturned vehicle and the road where the rescue vehicle was parked. Fire department personnel were warned that the power lines were down and to be careful. A power company employee was notified of the transformer fire and was enroute to de-energize the power line. In an effort to stabilize the accident vehicle and prevent it from turning over, a steel cable attached to a winch mounted on the rescue vehicle was extended to a length of 47 feet, pass between the conductor on the ground and the sagging conductors, and was attached to the luggage rack of the accident vehicle. The fire chief, six firemen, an emergency medical technician (EMT) employed by the ambulance company, and a bystander were all holding on to the steel cable. Five firemen let go of the cable after having been told to "stand back." The luggage rack then pulled loose and the rack and cable contacted the energized lines. The fire chief and the bystander were both electrocuted. It is estimated that the fire chief was in contact with the electrified steel cable for approximately 30 to 45 seconds. One fireman who was not wearing turnout gear and the ambulance company EMT did not let go of the cable before it became

energized. They were injured, receiving severe electrical burns. Those firemen not holding the cable when it became energized felt a slight electrical shock from the ground.

The firemen were all EMT qualified and responded immediately. The fire chief, the bystander, and the injured fireman and ambulance company EMT were freed from the electrical steel cable with the use of a fiberglass pole. Cardiopulmonary resuscitation (CPR) was initiated within seconds and the injured fireman was revived after experiencing full cardiac arrest. Resuscitation efforts failed to revive the fire chief who was rushed to a nearby hospital where he was pronounced dead by the attending physician.

Cause of Death:

The medical examiner determined that the cause of death was due to electrocution.

Recommendations/Discussion:

Recommendation #1: Electrical sources that pose an imminent danger to rescue personnel should be de-energized prior to any initial rescue attempt.

Discussion: Attempting to extricate an injured person from a vehicle amid an electrical hazard of this magnitude only further endangered rescue personnel and the person originally involved in the automobile accident.

Recommendation #2: Fire department standard operating procedures should require the wearing of personal protective equipment for all fire department rescue personnel responding to the scene of an emergency.

Discussion: Standard operating procedures in the fire department handbook address "wearing protective gear on the fire scene" and states that "All firemen riding a fire apparatus shall wear protective gear when responding to an emergency..." The requirement should be expanded to include the mandatory wearing of personal protective equipment such as helmets, gloves, rubber boots, etc. of all rescue personnel including the fire ground commander when responding to any emergency.

Recommendation #3: Only authorized rescue personnel should assist in rescue procedures.

Discussion: Unauthorized persons such as bystanders and passers by should be restricted from entering into the immediate accident area where trained rescue and emergency personnel are present, and under no circumstances should unauthorized persons be allowed to participate in rescue operations where imminent dangers exist. Such well-intended volunteer help is often poorly, if not totally, untrained in rescue techniques. The presence of bystanders often hinders the efficiency of trained rescue personnel and poses an unnecessary hazard to rescuers and to the bystanders themselves.

Recommendation #4: Firemen should be trained in recognition and appreciation of hazards, preventive measures for personal safety during rescue operations, and safe rescue techniques.

Discussion: Although firemen are trained in various firefighting techniques, it would appear additional training is needed in hazard recognition, particularly electrical hazards. This training should include recognition, awareness, safe rescue procedures, and an appreciation of electrical hazards, along with necessary preventive measures to avoid future accidents of this nature. Rescue personnel assumed an extreme and unnecessary risk by threading a steel cable between downed, energized power lines and attaching the cable to the luggage rack in order to stabilize the accident vehicle. The very idea was ill-conceived. Its realization posed an imminent danger with fatal results. Another method to prevent the vehicle from overturning should have been considered under these circumstances and future training of emergency service personnel should address the utilization of safer rescue techniques.

Recommendation #5: Personnel assigned responsibility to coordinate activities at an accident site (i.e. fire ground commander) should not become involved in the rescue effort, if an adequate number of personnel are available.

Discussion: It would appear that a sufficient number of personnel were available at the accident site to preclude the need for the fire chief to be involved in the "hands-on" rescue. His involvement in the rescue may have diminished his ability to recognize the seriousness of the hazard and to take corrective action.

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