

13.0 ELECTRICAL ACCIDENT RESCUE AND EMERGENCY ACTION PLANS

13.1 OSHA STANDARDS

The Company's site first-aid & medical and emergency rescue procedures/action plans should be developed, implemented, and administrated in compliance with applicable Federal or State OSHA standards including:

- 1926.23 First-Aid and Medical Attention.
- 1926.33 Access to Employees Exposure and Medical Records.
- 1926.35 Employee Emergency Actions Plans.
- 1926.50 Medical Services and First-Aid.
- 1926.65 Hazardous Waste Operations and Emergency Response.
- 1926.103 Respiratory Protection.
- 1910.134 Respiratory Protection.
- 1910.146 Confined Space Entry.
- 1910.1030 Bloodborne Pathogens.

13.2 RESPONSIBILITIES

a. Site Superintendent

- Have knowledge of the Customer's site first-aid/medical treatment services available for contractors.
- Determine Customer's emergency medical and rescue team capabilities and action plans.
- Establish site medical, first-aid, and emergency medical transportation procedures, when required.
- Obtain list of recommended first-aid/medical providers from Company's insurance carrier.
- Formulate written agreements with local physicians, clinics, ambulance services and hospitals.
- Provide for appropriate site first-aid kits and emergency supplies and rescue equipment.
- Develop Company's site emergency medical and rescue procedures and action plans.
- Conduct and document emergency action plan training sessions for Foremen and employees.
- Arrange for Foremen to attend first-aid, CPR, bloodborne pathogens training courses.
- Ensure that Foremen and employees have been trained to safely response to electrical accidents.
- Train Foremen and employees working in confined spaces to perform rescue & emergency services.
- Assign light duty work only after receiving the approval of the treating physician.
- Have Company first-aid/medical reports and records maintained on a confidential need-to-know basis.

b. Foremen

- Be knowledgeable as to Company and Customer site first-aid/medical procedures.
- Attend first-aid, CPR, and bloodborne pathogens training courses.
- Ensure that employees know how to report an emergency condition - electric shock, fire, spill, etc.
- Train employees to safely response to an accident caused by electrical shock, arc flash, and/or arc blast.
- Attend Company's site emergency action plan orientation session.
- Attend hands-on training sessions for confined space rescue, high rescue operations, when required.
- Comply with physician guidelines for assigning light duty work and follow-up treatments.
- Keeping first-aid kit properly maintained, clean, and readily available in the Company's vehicle.
- Maintaining a list of medical emergency and rescue service telephone numbers on person & in vehicle.

c. Employees

Crew Members should attend a project pre-job safety orientation session to be informed of the following:

- Telephone numbers and how to report an emergency condition - medical, fire, spill, etc.
- Location and normal operating hours of on-site first-aid treatment facilities.
- Emergency notification procedures to be followed during off-shifts and weekends.
- Location of first-aid kits, stretchers, and eye wash stations & showers.
- First-aid, CPR, and bloodborne pathogens training courses.
- Company's site emergency action plan orientation session.

- When required, the Company's confined space emergency rescue training session.
- How to safely response to an accident caused by electrical shock, arc flash, and/or arc blast.

d. Safety Coordinator

The Safety Coordinator reports directly to the Site Superintendent and is responsible for the following:

- Assist In developing the Company's site-specific medical and first-aid program.
- Conduct or schedule basic and advanced first-aid, CPR, and bloodborne pathogens training courses.
- Interface with the Company's site Consulting Physician, as required.
- Obtain three quotations, when purchasing medical and first-aid kits, supplies, and equipment.
- As per the Physician's standing orders provide emergency treatment for serious injuries or illnesses.
- Perform basic first-aid treatment for non-serious injuries and illnesses.
- Transport those of a non-serious nature to local hospital or clinic.
- Refer non-occupational injuries and illnesses to the employee's own physician as the need is indicated.
- Prepare and maintain current and complete Company medical and first-aid records and logs.
- Keep first-aid equipment and supplies properly maintained, clean, and arranged neatly.
- Conduct or schedule hands-on confined space emergency rescue training sessions.
- Interface with Foremen to ensure compliance with the Company's light duty work programs.

e. Subcontractor Superintendents

Each Subcontractor Superintendent should be responsible for his or her company being in full compliance with applicable OSHA, Customer and Company site first-aid & medical, and emergency rescue programs, procedures, and action plans. Details concerning the scope and requirements of the site medical and first-aid programs should be discussed at both the pre-bid and pre-job orientation meetings.

13.3 CUSTOMER REQUIREMENTS

At the Customer's pre-bid and pre-job review meetings, the President and Site Superintendent should request that the Customer's project management representative describe the scope of Customer's first-aid and medical programs being provided to site contractors. If the Customer has already established agreements with local physicians, medical clinics, hospitals, ambulance service companies, air-rescue helicopter companies, burn treatment centers or advanced trauma centers, to service project employees with emergency treatment and care resulting from occupational work exposures, this information should be obtained, incorporated into the Company's site-specific medical & first-aid program, and communicated to job site employees.

The President and Site Superintendent should ask for permission to tour the Customer's facility or project medical facility and meet with the Customer's site nurse or EMT to review emergency first-aid and medical services being extended to site contractors. Based upon the information obtained from the Customer, the President and Site Superintendent should develop with the help of the Consulting Physician, a Company site-specific first-aid and medical program.

13.4 MEDICAL EMERGENCY PRE-JOB PLANNING

a. Pre-Job Survey

The Site Superintendent should perform a pre-job survey prior to the start of any construction work on the project. This survey must be conducted on all new "grass roots" construction projects, where there are no Customer medical facilities or whenever the Customer's facility or project medical facility will not be made available to Company employees.

The Site Superintendent should meet with the Company's workers compensation insurance Claims Manager from the carrier's local office that will be handling the workers compensation claims. Federal, State, City and Local requirements should be thoroughly reviewed to ensure compliance by the Company.

Reporting procedures should also be established for the proper execution of the insurance policy. The insurance carrier's Claims Manager should be able to recommend those physicians, clinics, or hospitals that provide the best medical treatment at reasonable cost to the Company.

b. Physicians

A selection of physicians available should be based on prior experience in the area, and contacts with the Customer, other employers, and the Company's workers compensation insurance carrier.

The doctor, who is going to serve as the Company's Consulting Physician, should be subject to the approval of the workers compensation insurance carrier. The carrier should also approve other types of physicians, such as, eye doctors and dentists. A meeting should be held with the doctor to introduce him or her to the Company's safety program and philosophy regarding a vigorous attempt to prevent accidents.

c. Hospitals

A conference with hospital representatives should be scheduled, at which time, arrangements should be developed for the coordination of project and hospital efforts for the medical treatment of employees, who become injured or ill. The hospital's capabilities are to be ascertained and their facilities visited and transport routes noted based on traffic conditions. Hospital authorities should be requested to give advice regarding ambulance and doctor services in the area which would best serve the Company's needs.

d. Ambulance Service

A survey should be made to determine what ambulance services are available for the job site. Capability, proximity, and time required to meet emergency calls at different times of the day are important. State laws regulating emergency medical services should be fully reviewed.

e. Helicopter Service

Available private and hospital medical emergency helicopter service should be investigated. Contacts should be made to establish the necessary steps to implement emergency helicopter service, if ever required.

f. Special Medical Treatment Centers

Arrangements should also be made with burn treatment and advanced trauma centers to treat electrical accident victims for serious injuries resulting from site work activities.

13.5 FIRST-AID EQUIPMENT & SUPPLIES

a. General Requirements

The equipment and supplies in the first-aid facility and available on the job site should be designed to fill the expected needs, which might arise from employee occupational injuries and illnesses. The items and amounts of each item needed on the project site will vary from site to site depending on the following variables:

- Size of work force.
- Type of work.
- Availability of medical services on and off the job site.
- Types of injuries and illnesses, which might be expected.
- Scope and environment of the work locations.

The Site Superintendent should requisition supplies as required to meet the needs of the project. These requisitions are subject to the approval of the Consulting Physician. The Site Superintendent should instruct the Safety Coordinator to maintain these first-aid supplies in the most functional work locations and within the professional standards of cleanliness, sterility, and orderliness.

b. Company First-Aid Kits

The Company's first-aid kits should be mounted for ready accessibility in strategic locations with respect to the job needs in addition to being provided in each Company vehicle. The type of industrial type first-aid kits purchased by the Company must include first-aid supplies for burn victims.

It will be the Safety Coordinator's responsibility to inspect the each first-aid kit at least once per week and assure that used supplies are replaced and that the kits are maintained in a clean and orderly manner.

c. Emergency Eye Wash Stations & Showers and Portable Emergency Eye Wash Bottles

Locations of emergency eyewash stations and safety showers must be posted so that they are easily found to cool and flush the "burn" victim after an accident. The Safety Coordinator should have available portable emergency eye wash bottles for crew members working in remote locations.

d. Stretchers

The Safety Coordinator should inform Foremen and Employees during the new-hire safety orientation sessions of the locations site Stokes- or sked-type stretchers that can be used to safely transport injured or ill employees to the ambulance. Proper lifting slings will be maintained on stretchers.

13.6 FIRST-AID TREATMENT

Every injury case, no matter how minor, will immediately be reported by the employee to his or her Foreman and then referred to the project's first-aid facility. All first-aid care must be performed in a thorough and professional manner. Employees, who need treatment beyond that which is normally considered first-aid care, must be transported to a Company-approved physician or an emergency medical facility for treatment.

Employees, who request treatment for personal injury or illness from incidents, which did not arise in the course of their employment on the Company's project site, normally should be referred to their own personal physician. Only those employees, who had an up-to-date and valid first-aid and CPR cards should render first-aid treatment or CPR. Bloodborne Pathogens training is a requirement for employees with First-Aid and CPR cards. Company Subcontractors are responsible for the treatment of their on-site employees.

13.7 LOCAL EMERGENCY MEDICAL FACILITIES AND BURN TREATMENT CENTERS

The Site Superintendent should evaluate medical facilities in the immediate job site location to determine in advance, where employees that are electrical accident victims should be taken and how they will be transported. Plans must be in place for transporting electrical accident victims as quickly as possible to a burn center or other medical emergency treatment facility that specializes in electrical trauma.

13.8 EMERGENCY NOTIFICATION PROCEDURES

The Site Superintendent should have posted at each company site telephone location and in each Company vehicle, emergency telephone numbers, covering consulting physician, hospital, ambulance service, project security main gate, local and state police, fire department, EPA, and the Customer's safety department for all shifts, weekends, and holidays.

The Site Superintendent should issue to every Foreman a current copy of emergency telephone numbers, street addresses, names of key personnel, and written directions with local street maps for all off-site emergency medical treatment facilities.

13.9 EFFECTS OF ELECTRICAL ACCIDENTS

In the case of an electrical accident, the extent of an injury to the victim often is not immediately apparent. Some symptoms may be masked by the more readily apparent thermal effects of the burns.

a. Biological Effects of Electric Shock

Emergency room personnel must be aware of additional possible biological effects of electric shock. In an arc flash or arc-blast energy accident, the victim's skin, ears, eyes, lungs, internal organs, and nervous, muscular, and skeletal systems can be affected not only by the direct effects of electrical current, but also by the following:

- Radiant heat from an electrical arc that produces extremely high temperatures.
- Disturbance of the heart's electrical conduction, causing changes in the heart rhythm or possible cardiac arrest.
- Damage to eardrums from the acoustic and vibratory forces around arc blast.
- Inhaled or deposited vapors released through an arc explosion.

b. Types of Injuries:

- Low-voltage contact wounds.
- High-voltage contact wounds of entry and exit of electrical current.
- Burns.
- Respiratory difficulties. (The tongue may swell and obstruct the airway or vaporized metal or heated air may have been inhaled.)
- Infectious complications.
- Injury to bone through falls, heat necrosis (death of tissue), and muscle contraction. (Shoulder joint injuries and fracture of bones in the neck are common injuries caused by muscle contraction.)
- Injury to the heart, such as, ventricular fibrillation, cardiac arrest or stoppage.
- Internal and organ injuries.
- Nerve system injury.
- Injury to the eyes. (Cataracts from electrical injury have been reported up to three years after an accident.)

c. Enhancement of Chances for Recovery

In most electrical accidents, the inability to diagnose the extent of injury at the time of admission to the hospital can delay the patient's treatment. Recovery can be enhanced by more detailed information about the accident, including the system voltage, amount of available current, length of contact with current, and possibility of arc flash. Recovery can be maximized by transporting the victim as quickly as possible to a burn center or other facility that specializes in treatment of electrical trauma.

After the victim's immediate needs are met, note as many details of the accident as possible. The details can help an accident victim's emergency room personnel provide appropriate medical attention. It is especially important that hospital personnel know the cause of the victim's injuries. They need to know if the victim had contact with electricity or if arc flash caused the injuries. While the victim of electrical contact may suffer some surface burns, where the current entered the body, he or she often suffers additional internal damage, because of the path of the current through the body.

The flash burn victim is more likely to have greater evident burn damage on the surface of the body, due to the extremely high temperatures from arc flash. He or she is likely to suffer first, second, and third-degree burns, especially on the face, wrists, ears, back of the head, neck, and ankles. Any skin surface that is not adequately covered by protective clothing or equipment is at risk.

In addition to burns to the skin, the flash burn victim may also have inhaled metal vapor, such as, copper into the lungs or suffered adverse effects, such as, damage to the eardrum, due to the pressure wave caused by arc blast.

13.10 ELECTRICAL ACCIDENT RESPONSE PROCEDURES

In response to an electrical accident, the following procedures should be followed immediately:

- Remove the immediate hazard; if possible safely turn off the source of the electric power.
- If the power cannot be turned off, make sure you and the victim are not in contact with any electrical source and out of reach of any downed or broken wires.
- If the person's clothing is on fire, remind him or her to drop and roll, or tackle him or her, if necessary, to smother the fires.
- Speed is essential. Call 911 or have someone else call 911 for help.
- Immediately start giving CPR if the victim has stopped breathing or there is no pulse.
- Give first aid treatment to the victim for burns and fractures.
- Cool the burn with water or saline for a few minutes or until the skin returns to normal temperature. For flash burn victims, safety showers may be the best method due to the possibility of wide-spread surface burns on the body. Do not attempt to remove clothing that is stuck to a burn.
- Remove constricting items, such as, shoes, belts, jewelry, and tight collars from the victim.
- Elevate burned limbs to reduce swelling.
- Handle the victim with care, being aware that he or she might have broken bones or spinal injuries.
- Treat for shock, maintain body temperature, do not give anything by mouth; administer high concentrations of oxygen, if available.
- Keep the victim warm and as comfortable as possible, while awaiting transport to the medical facility. Cover him or her with clean, dry sheets or blankets. Cover burn wounds with sterile dressings or clean sheets.

13.11 RESCUE TEAMS OPERATIONS

a: Rescue Team Personnel Qualifications

During the pre-bid and pre-job review meetings with the Customer Project Manager and/or the General Contractor, the Company's President and Site Superintendent should determine the existence of any on-site emergency first-aid & medical and rescue team operations. Information must also be obtained as to any Customer or General Contractor agreements that have been set-up with outside emergency first-aid & medical and rescue team operations to cover site contractor operations.

The Site Superintendent should formulate the Company's site emergency first-aid & medical and rescue response action plans based upon information obtained at the pre-bid and pre-job meetings and by using the following principles:

- Of all the site workers, the Company's site employees have the most hands-on work experience concerning the hazards associated with installing, upgrading, maintaining, check-out, testing, and startup of electrical systems, equipment, or components and can best respond to an electrical accident.
- All Company Site Superintendents, Foremen, Site Safety Coordinators, Journeymen & Apprentice Electricians should be trained and required to maintain certification in both basic and advanced first-aid and CPR techniques.
- Company employees should also be trained in compliance with OSHA's 1910.1030 Bloodborne Pathogens Standard.
- Company employees should be trained, during their project new-hire safety orientation sessions and annually thereafter, on the safe procedures to follow, when an electrical accident occurs.
- Company employees, prior to being assigned to perform work in a confined space, will be required to attend hands-on emergency rescue training sessions.
- OSHA requires that rescue services personnel should be trained to perform the assigned rescue duties and utilize rescue equipment.

b. Rescue Time Frame Guidelines

If the electrical accident victim's breathing or heart stops, brain damage will usually begin in four to six minutes. Giving CPR is essential to avoid brain damage. The best hope of saving the victim is to have a fellow crew member to immediately start giving the victim CPR, until the emergency medical personnel arrive at the scene to take over giving CPR.

c. Confined Space Rescue

NECA's newly published Confined Space Entry Manual - #5090 provides detail guidelines for establishing confined space emergency and rescue action plans - see page 87. This manual also lists OSHA's criteria for evaluating appropriate rescue services to ensure that rescue team members have been properly trained, equipped, and can respond in a timely manner to the Company's confined space emergency.

According to a National Institute of Occupational Safety & Health (NIOSH) study of confined space fatality accidents, 92% of these confined space incidents had hazardous atmospheres with 82% being toxic or flammable (hazardous materials) and the remainder 18% being oxygen deficient. There have been numerous cases of confined space accidents involving co-workers, police and/or rescue team members entering into the confined space to try to rescue the first victim and they too were killed.

OSHA's 1910.146(k) permit-required confined spaces entry standards require that the host employer of the space to be entered, to ensure emergency rescue services are trained in making rescues from permit spaces and these services are available as a part of their entry permits emergency action plans. The OSHA standard also requires that the Company should ensure that at least one standby person at the site is trained and immediately available to perform rescue and emergency services.

Therefore, the Site Superintendent should only assign those site employees to work in confined spaces, who have been trained and certified in first-aid, CPR, bloodborne pathogens, and provided hands-on experience in using the rescue equipment and devices, including tripod hoist, retractable lifelines, and full-body safety harness.

e. High-Rescue Operations

When Company employees work at high elevations (over 70 feet high), the Site Superintendent should schedule a pre-job planning meeting with the Customer and/or outside rescue team groups that are qualified and trained to conduct high rescue operations. The high rescue group team leader and members will be requested to visit the Company's work site location to pre-plan for possible high rescue operations.

Examples for high elevation work include, but are not limited to the following:

- Working on overhead structures to install, upgrade, or repair ceiling lighting fixtures.
- Stacks.
- Power line towers.
- Tanks.

f. Rescue Equipment and Devices

The Site Superintendent should purchase and have available on site, appropriate rescue equipment and devices, for employees' pre-job assignment emergency rescue training sessions and for employees use at each confined space and high elevation work location. The Site Safety Coordinator should instruct each Foreman and employee on how to properly inspect, set-up, test, properly use, maintain, and store the Company's rescue equipment and devices.