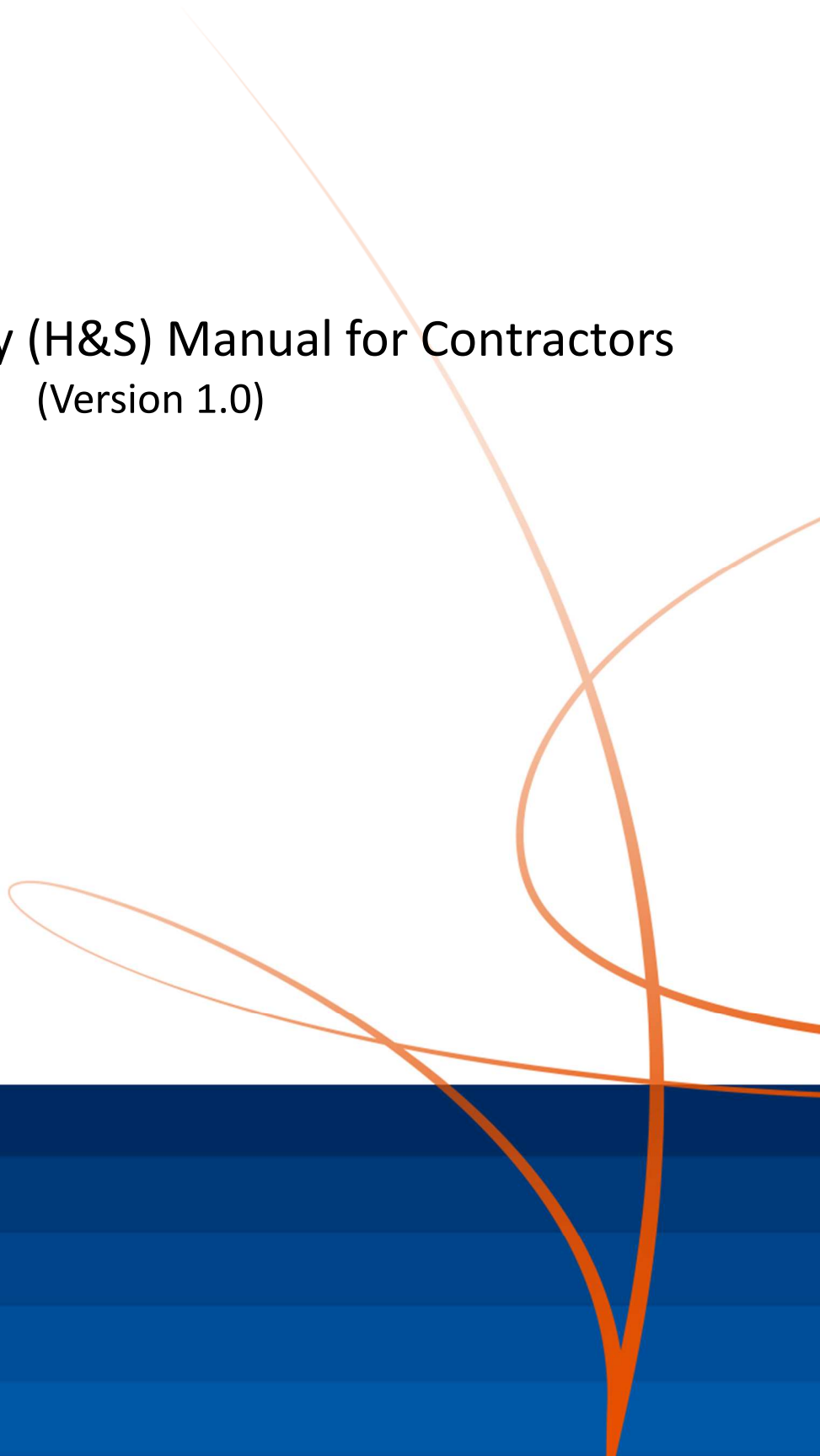


Health and Safety (H&S) Manual for Contractors (Version 1.0)



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1. Purpose

This manual sets out NEC Group (NEC) expectations, in areas of Health and Safety (H&S), of all contractors of NEC as defined in the scope and provides guidance in how these expectations can be met.

The contractor shall meet these H&S requirements when conducting work under contract to or on behalf of any entities related to or affiliated with NEC. These requirements do not supersede any other requirements, such as those described in applicable contracts between NEC and the contractor or in the applicable national or state laws and/or regulations, but are intended to complement them.

To align with the NEC H&S Policy, NEC requires that its contractors:

- comply with all applicable H&S laws, regulations and industry standards; and
- comply with all H&S requirements contained in the contract between the applicable NEC Entity and this manual. In the event of a conflict between the terms and conditions of any such contract and this document, the terms and conditions of such contract shall prevail.

Contractors are responsible for the health and safety of their employees, its subcontractors (where applicable), members of the public and others who may be affected by its activities, and for the safe and environmentally acceptable performance of their work.

NEC believes in “zero accidents” with respect to health and safety while performing work for NEC or NEC’s customers. All contractors and their subcontractors are required to strictly observe all health and safety requirements, all of NEC’s requirements and any mandatory health and safety requirements of NEC’s customer when working in NEC’s customer premises or on behalf of NEC or its customers. This requirement extends to all levels of subcontracting done by the contractor. Circumventing safety procedures and not utilizing required safety equipment or personal protective equipment (PPE) will not be tolerated. The consequences for contractors that fail to observe safety requirements will be disciplinary in nature up to and including termination of the contract. A breach of safety requirements will be deemed to be a breach of contract with NEC.

Contractors shall ensure that H&S hazards and risks are properly identified, assessed, controlled and evaluated prior to any work begins. Only applicably competent / certified persons may perform the specified activities.

2. Scope

The requirements outlined in this document apply to all NEC contractors and can be used as a guidance document for other works / services including, but not limited to, construction activities, equipment installation or de-installation, maintenance or repair activities for or on behalf of NEC and its customers.

3. Definitions and Acronyms

The following definitions apply to this document:

NEC – NEC or the NEC subsidiaries or affiliates for which the contractor is working.

Authorized – Those persons permitted in a work area by NEC or the contractor because they are aware of the potential hazards, the precautions to be taken and they possess the required certifications and licenses as per regulatory requirements (e.g., electricians, tower climbers, crane operators, aerial lift operators).

Competent Person – An individual who, by way of training, education and experience, is knowledgeable of applicable standards, capable of identifying workplace hazards or environmental aspects relating to the specific operation, is designated by the employer and has the authority to take appropriate corrective actions.

Critical Lift - Any lift: utilizing multiple cranes; exceeding 85%^{*1} of total capacity of the crane at lift radius; over an occupied structure or public street; of lifting an item of high value or long replacement time.

Dynamic Risk Assessment - The continuous process of identifying hazards, assessing risk, taking action to eliminate or reduce risk, monitoring and reviewing, in the rapidly changing circumstances of an operational incident.

Hot work - Any work involving burning, welding, torch cutting, grinding where sparks are produced, soldering, or brazing in construction, maintenance and fabrication.

High risk - Refers to a risk level that is not acceptable, after evaluating the risk of a work activity, and must be mitigated to at least a medium level before the work begins. Risk control measures should not be overly dependent on PPE and management review is required prior to work beginning.

Inclement weather - The existence of rain, such as typhoons and rainstorms or abnormal climatic conditions (whether they be those of hail, snow, cold, high wind, severe dust storm, lightning, extreme high temperature or the like or any combination thereof) by virtue of which it is either not reasonable or not safe for workers exposed thereto to continue working whilst the same prevail.

Lost Time Injury (LTI) - An occupational injury or illness resulting in lost productive worktime. An injury is considered an LTI only when the employee is not able to perform the regular work duty.

Medium risk - Refers to a risk level that is tolerable but careful evaluation of hazards associated with the work activity must be carried out to ensure the risk is reduced to as low as reasonably practicable. Interim control measures like administrative controls and PPE may be used while long term control measures are being established.

Method Statement – Sometimes referred to as a Safe System of Work” (SSOW), describing the way a work task or process is to be completed. As a minimum, details site location, landlord’s details, known hazards on site and details of nearest hospital or medical centre. The method statement should outline the hazards involved and include a step by step guide on how to do the job safely. The method statement must also include which control measures have been introduced to ensure

¹ Definitions. - 1926.751 - Occupational Safety and Health Administration
https://www.osha.gov/pls/oshaweb/owadis.show_document?p_table=STANDARDS&p_id=10787

the safety of anyone who is affected by the task or process.

Radio Frequency (RF) - Electromagnetic emissions that may present a health impact from radio technologies and, more specifically, mobile telephony.

Safety Data Sheets (SDSs) – An important component of product stewardship and occupational safety and health. It is intended to provide workers and emergency personnel with procedures for handling or working with chemical substances in a safe manner, and includes information such as physical data (melting point, boiling point, flash point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures.

Stand-off distances – Distances that workers should maintain from potentially energized transmitting antennas to ensure that exposure to RF energy remains well below appropriate Maximum Permissible Exposures (MPEs).

Supplier Personnel – Includes, but is not limited to, supplier's direct, full time, part-time, temporary and contracted employees, consultants, contractors and any other third parties hired or used by the supplier to provide the services or perform the work at the NEC assigned work sites.

4. Requirements for all Projects

4.1 General Requirements

- a. As noted above in Section 1, the requirements set forth in this manual are the minimum expectations of NEC. No NEC entity may make representations, guarantees, or warranties that these requirements, by themselves, represent appropriate safety practices as may be reasonable and customary in the industry, nor shall any statements by any NEC employees or their agents be interpreted as making any such representation, guarantee, or warranty. The Contractor remains liable for the safe performance of the work and NEC reserves all rights and does not waive any claims regarding the safe performance of the work.
- b. The contractor shall take all reasonable actions to prevent personal injuries and environmental incidents associated with the work to be performed.
- c. The contractor shall designate an H&S representative who will be responsible for ensuring that all H&S requirements are followed at all work sites including monitoring, inspection and supervision of next tier contractors. The contractor may designate one of its contractors' employees as the H&S representative, but the contractor will remain directly responsible for the H&S performance and compliance with this manual and all applicable laws and regulations. Contractors shall hold a safety briefing (daily tool box safety meeting) covering the precautions to take for that day's work.
- d. Safe access and egress to the work site to be maintained at all times.

- e. All H&S documentation related to the work to be performed by a contractor must be provided to NEC or affiliates upon request.

4.2 Training and Qualifications

To improve each worker's awareness and knowledge of safe work and the prevention of accidents and incidents, NEC requires that all persons working for and / or on behalf of the Contractor have appropriate training. For example measures to protect workers from dangers in the work place, requirements to handle machines and /or dangerous substances and also have the appropriate legal qualifications to perform the work where required.

- a. The contractor shall ensure that their employees and the employees of their subcontractors, if any, receive appropriate training and instructions and are both competent and able to perform the work in a healthy, safe and environmentally acceptable manner.
- b. The contractor shall provide acceptable proof of qualifications, safety training or certifications, for all such employees to the applicable NEC entity upon request. For example – certifications / licenses as locally required for electricians, tower climbers, aerial lifts, crane and powered industrial lift truck operators.

4.3 Emergency Response

To eliminate risks as much as possible, NEC requires the Contractor to take appropriate actions and create a plan for emergency response.

- a. The contractor shall immediately respond to emergency situations involving their employees and those activities directly under their control (including the control of any of their subcontractors) commensurate to the event.
- b. On any NEC premises, the contractor shall become familiar with and follow the appropriate local emergency response plan and notification procedures.
- c. On any NEC customer's premises, the contractor shall become familiar with and follow the emergency response plan and notification procedures prescribed by such customer.
- d. In the absence of a customer emergency response plan, the contractor shall develop and follow its own *Emergency Response Plan*, which shall include the appropriate on-site response to emergencies and the notification of the appropriate external authorities and emergency response personnel in a timely manner.
- e. The *Emergency Response Plan* shall address the actions to be taken by the contractor's employees or their subcontractors in response to fire, evacuations, accidents, injuries, work-induced illnesses, environmental incidents and any other

event that creates or could reasonably create an emergency situation.

4.4 Notification

It is NEC's goal to prevent all accidents and incidents in the workplace.

However, in the event of such accidents and incidents, the contractor shall, in order of priority, ensure the proper rescue and aid of victims, notify the appropriate authorities and inform NEC.

- a. The contractor shall make all legally required accident / incidents notifications including "Lost Time Injury" and "Near Miss" accidents to the appropriate authorities and NEC representatives within the time limits prescribed by such authorities.
- b. The contractor shall notify the applicable NEC representative as soon as is reasonably possible (preferably within 24 hours) after personal injuries, fatalities, environmental incidents, property damage or regulatory inspection so that such notification does not, in any way, delay the handling of the emergency or affects the response time.
- c. The contractor shall work with NEC local teams as required to ensure a complete investigation including root cause analysis with appropriate corresponding corrective and preventive actions and report it to the NEC representative. Electronic format is preferred.

4.5 Risk Assessment

To identify, evaluate and decide on precautions required for the mitigation of hazards and risks in the workplace, NEC requires the Contractor to conduct risk assessments.

- a. During the project planning phase, the contractor shall conduct and document a generic or project specific risk assessment of the operations, facilities, and equipment applicable to the work to be performed. All work activities identified with "High" risk must be controlled and the elimination of such activities is to be considered. If elimination is not possible, at least mitigation of "Medium" risk before work begins.
- b. A Method Statement is to be prepared and documented for each installation. It shall outline the hazards involved and include a step-by-step guide on how to do the job safely. It shall also detail which control measures have been specified to ensure the safety of anyone who is affected by the task or process and be used to communicate the risk and precautions required to all those involved in the work. It should be clear and illustrated by simple sketches where necessary. Equipment needed for safe

working shall be clearly identified and available before work starts. Workers should know what to do if the work method needs to be changed. Emergency arrangements shall be included in the method statement.

- c. On arrival at the installation site, and before any work is undertaken, the contractor shall conduct an on-site risk assessment, often referred to as a “dynamic” risk assessment, evaluating site-specific hazards including the ones affected by inclement weather, how they could affect the install and the means of mitigation. This “dynamic” risk assessment shall be recorded and signed off by all persons involved in the install. Sign-off shall demonstrate agreement and understanding of the “dynamic” risk assessment. When visitors arrive on site during the works, an H&S induction to be completed. The “dynamic” risk assessment to be used as part of this induction process.
- d. The contractor shall promptly notify the applicable NEC representative of any defect, unsafe, unhealthy or environmentally unsound condition identified during the “dynamic” risk assessment that prevents or may prevent a safe and proper installation from being completed. When a risk or hazard cannot be mitigated, work is to be stopped until it is safe to proceed.

4.6 Site Inspections / Corrective Actions / Post Job Evaluations

NEC requires the Contractor to take corrective actions on observed hazards or potentially hazardous conditions when such hazards are identified through site inspections.

- a. The contractor shall conduct and document periodic site inspections to identify and correct any observed or potentially unsafe or environmentally unacceptable conditions.
- b. Documented periodic site inspections to be made available to the applicable NEC representative or any of their representatives upon request. The contractor shall promptly correct any observed or potentially hazardous conditions at the contractor’s expense if the condition is of their making and notify NEC if the condition was not caused by the contractor.
- c. The contractor shall collaborate with and contribute to post Job Evaluations as required.

5. Specific Requirements for Carrier and System Integration Business

The following rules are applicable for high risk work activities identified for Carrier and System Integration businesses where on-site construction, installation, maintenance or demolition works

are involved. The operations involve working at height, working with electricity, lifting, driving and working at remote worksites.

- i. Always wear appropriate personal protective equipment (PPE). When working at height, use a fall arrest system. A safety harness must be worn and ensure 100% tie-off at all times (either to lifeline or secure anchor points).
- ii. No person shall work directly below any other person working above them.
- iii. Do not work on or near energized equipment unless qualified / licensed.
- iv. Always have a lifting plan in place before a lifting operation involving crane / hoist begins.
- v. Observe speed limits and road conditions when driving.
- vi. Do not use mobile phone when driving.
- vii. Do not drive or work under the influence of alcohol or drugs.

Failure to comply with any of above rules will constitute a material breach of contract and NEC reserves the right to audit contractors' compliance with these rules.

6. Programs & Specific Requirements

6.1 Work in Inclement Weather

Serious and fatal accidents may occur at workplaces in inclement weather conditions, such as the loss of body balance resulting in falls, electric shock or electrocution due to leakage of current from wet electrical equipment and the slipping of tools or equipment.

The contractor should not underestimate the danger of inclement weather and should adopt a flexible approach and give prime consideration to employees' safety both in the workplace and during their journeys to and from work.

NEC requires the Contractor to –

- a. stop work at places with risks of falling objects or fall of persons and avoid operating cranes such as tower cranes etc.
- b. remove or secure loose materials.
- c. secure plant and scaffolds.
- d. stay inside a safe shelter away from metal pipes, cable, structure, fences or window glasses.
- e. not perform work at height that cannot be safely performed.
- f. not use an umbrella which can cause loss of body balance due to strong wind.
- g. use suitable PPE e.g. safety helmets.
- h. use safe means of transport and have a route for evacuation.

- i. use battery-operated radio for listening to weather broadcasts.
- j. always remain alert on changes to the working environment.
- k. prepare for evacuation at any moment.
- l. be familiar with the escape route in case of emergency.
- m. follow established safety procedures.
- n. resume work only when conditions improve.

During a lightning thunderstorm the contractors shall

- o. keep away from antennas, masts, guy wires and all grounding and lightning protection equipment, including ground rods.
- p. not work on conductive materials such as electrical lines, tower structures or pipelines and not wear highly conductive equipment, e.g. a headset .
- q. if in a vehicle, stay in the vehicle until the lightning ends. Avoid touching metal or other surfaces in or outside the vehicle that conduct electricity.
- r. not climb towers.
- s. not lie down on a concrete floor or lean against a wall . Stay away from tall trees and telecommunications towers in an open area or on a hilltop.

6.2 Chemical Management

Chemical substances have the potential risk to cause considerable health and environmental problems if they are not appropriately managed. To eliminate these problems and hazards, NEC requires the Contractor to manage and handle such substances in a proper manner.

- physical hazards;
e.g. explosives, gases, flammables, toxic and radioactive substances,
 - health hazards;
e.g. acute toxicity, skin corrosion, serious eye damage and carcinogenicity,
and
 - - environmental hazards of acute aquatic toxicity and chronic aquatic toxicity.
- a. All chemicals used in the course of the work shall be included in the risk assessment.
 - b. The contractor is responsible for ensuring that all users are properly trained in the safe use and disposal of any hazardous material or chemical involved in or related to the project.
 - c. Chemicals and other hazardous materials must be properly labelled with the name of the chemical or material and its environmental, safety, and / or health hazards.
 - d. Appropriate PPE shall be used when handling chemicals.

- e. Chemicals and other hazardous materials shall be properly stored according to the manufacturer's recommendations and any applicable laws or regulations.
- f. Except for materials intended to be left as part of a project deliverable, chemicals and other hazardous materials shall be removed from an NEC or customer premises upon completion of the work activities.
- g. SDS's shall be readily available to the NEC and the individuals working on the site for any hazardous materials and chemicals as applicable, and provided upon request.

6.3 Barricades, Signs & Perimeter Guarding

When the work is performed, taking precautions against accidents is mandatory. NEC requires the Contractor to prepare visible warning signs so that all workers and the public are aware of the dangers in the workplace.

- a. Signs and temporary guarding, such as cones, tape, and posting guards, shall be used to warn individuals of potentially hazardous situations caused by or relating to the work being performed. Such work shall include, but not be limited to, excavation, trenching, electrical, construction, tower erection or climbing, antenna installation, and cable work. All barricades shall be appropriate for the application, visible, legible, and able to withstand any adverse conditions present at the work site and comply with all applicable laws and regulations.
- b. If the work restricts traffic on a roadway, warnings such as signs, cones, flags, sign / traffic worker(s), traffic lights, or other means of communication as appropriate and in accordance with local requirements shall be provided. Proper precautions shall be taken to communicate the restrictions and re-direct the traffic accordingly. The initial warning sign shall be located and maintained at least 300 meters (1,000 feet)², ahead of the work at all times unless a more stringent local requirement exists. All applicable H&S local work zone laws and regulations must be followed.
- c. If the work is being conducted at a tower or other elevated structure, signs and temporary guarding shall be placed at the perimeter of the work area. This is defined as the "drop zone" and it shall be a minimum of 1/2 of the working height³, unless a more stringent local requirement exists. If a minimum of 1/2 cannot be achieved, a

² D4.5 ADVANCE WARNING SIGNS of Traffic Safety Measures and Signs for Road Works and Temporary Situations, Part1:Design, 2009
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/203669/traffic-signs-manual-chapter-08-part-01.pdf

³ Definition – Bureau of Land Management
[http://www.blm.gov/style/medialib/blm/wo/Information Resources Management/policy/im_attachments/2006.Par.79069.File.dat/im2006-078attach1.pdf](http://www.blm.gov/style/medialib/blm/wo/Information%20Resources%20Management/policy/im_attachments/2006.Par.79069.File.dat/im2006-078attach1.pdf)

third man (spotter) shall be deployed at the edge of the “drop zone” whilst persons are working at height.

- d. Personnel, having to work in an area where guards, warning signs and / or controlled access are being established by another contractor, shall be aware of the hazard, take necessary precautions and follow all necessary steps to get access to and work on the subject site if granted permission and if safe to do so.

6.4 Confined Space Entry & Rescue

A confined space can be more hazardous than regular workspaces as it is an enclosed or partially enclosed space that is not primarily designed or intended for human occupancy with several hazards, such as poor air quality, chemical exposures, fire hazard and temperature extremes.

NEC requires the Contractor to identify the hazards and create a rescue program.—

- a. The contractor shall establish and maintain a Confined Space Entry & Rescue Program to enter confined spaces.
- b. All confined spaces encountered during the course of the work shall be evaluated for hazards before entry is allowed. Classification of the space shall be documented (e.g., entry permit required) and safe work practices applicable to the type of confined space shall be enforced.
- c. Atmospheric monitoring shall be performed to detect hazardous atmospheric conditions in confined spaces (such as manholes and vaults) prior to entry and such monitoring shall be documented and be made available upon request. These spaces shall be properly ventilated prior to and during entry in accordance with applicable H&S laws and regulations. One person shall stand guard, when required by local laws and regulations outside the confined space whenever another person enters it and shall be appropriately trained and ready to implement emergency procedures without putting themselves at risk in order to help that person if necessary. During a confined space entry, a mechanical means to extract a worker from the space must be available and in use in the event an emergency situation arises.
- d. The person(s) entering the confined space shall be provided with a means of communicating to person(s) outside the confined space. A mobile phone or walkie-talkie is recommended.
- e. No entry shall be allowed into a confined space that has an atmosphere that is immediately dangerous to life or health.

6.5 Personal Protective Equipment (PPE)

On-site work requiring contractors to wear PPE always involves high risk and performing regular maintenance and inspections of PPE is very important.

NEC requires the Contractor to ensure proper maintenance of and to wear the appropriate PPE for the work.

- a. Prior to its use, the contractor shall
 - perform inspection to determine if PPE is fit for purpose and whether they have no cracks, damages, wear or any other functional defects.
 - perform further inspection of PPE items following large damages or a big shock to ensure that their function is maintained.
 - perform further inspection by a qualified person at a frequency no greater than that stipulated by the manufacturer (more frequently if specified locally).
 - comply with the requirements of applicable laws / regulations.
- b. The Contractor is responsible for ensuring that PPE identified during the generic risk assessment is available to and worn by employees who will perform the work. Employees shall be appropriately trained in the proper use, maintenance and storage of PPE.
- c. Contractor's employees shall dress appropriately for the work being performed and for the prevailing weather conditions.
- d. Adequate eye protection (e.g., safety glasses with attached side shields; chemical goggles, welding glasses) shall be worn whenever the potential for eye injury exists (e.g., flying objects, use of power tools, potential for chemical splashing, working on or near exposed energized components) or when specified as a requirement at the site (whether under the contract or by law or regulation governing the work site or if specified by the customer).
- e. Appropriate footwear shall consist of, at a minimum, sturdy work boots or shoes.
- f. Steel-toe safety shoes may be required if identified in the risk assessment or if it is an onsite customer requirement.
- g. Hard hats shall be worn whenever there is a danger of being struck by falling objects, striking the head on a hard or sharp surface, working on or near exposed energized components, or whenever it is an onsite customer requirement. Non-conductive hard hats shall be utilized when performing electrical work.
- h. Neckties, loose clothing, long hair, and any kind of accessories, such as chains, watchbands, rings, and earrings shall not be worn when working near equipment

with moving or rotating parts.

- i. Metal jewelry shall not be worn while working on live exposed electrical components.
- j. Reflective vests shall be worn when working on or near public roads, railways, or highways or whenever high visibility is required.

6.6 Electrical Safety

Persons can be injured when they become part of an electrical circuit. Humans are more conductive than the earth, which means electricity will try to flow through their body if there is no other easy path.

NEC requires the Contractor to maintain proper handling and operation of electrical equipment.

- a. The Contractor shall develop and follow its own Electrical Safety procedures for ensuring that any requirements applicable to the type of job being done are addressed in accordance with applicable H&S laws and regulations (e.g., training, certificates / licenses / permits, etc.)
- b. The Contractor's procedures shall include steps for ensuring that equipment with hazardous energy is not inadvertently released while someone is working on it.
- c. Before commencing work, when possible, systems should be de-energized and appropriate lock-out/tag-out (LOTO) procedures followed.
- d. The contractor shall provide evidence of the certification, either academic or issued by government or duly recognized institution as related to its electricians.
- e. Earth leakage circuit breaker (ELCB) [also known by the term, *residual current circuit breaker*] shall be used on all portable tools and equipment utilized on outdoor construction/installation sites or when requested by the customer. Low voltage tools or isolating transformers shall be used if required by local regulations.

The contractor shall not use electrical equipment or tools in wet areas. If the skin of a worker is wet for any reason (rain, sweat, standing in a puddle of water), the works should be stopped.

- f. Portable electrical hand tools shall be double-insulated or grounded.
- g. Extension cords shall not be damaged, taped, or repaired.
- h. The contractor shall not place any materials such that they create obstruction and limit access to electrical panels on any NEC or customer's premises.
- i. Electrically insulated tools, fire retardant clothing, or insulating matting may be required, depending on the job requirements and local regulations.

6.7 Overhead Power Lines

It is often difficult for workers to notice overhead power lines, e.g. in foggy or dull conditions. Always assume that a power line is live. NEC requires the Contractor to plan the work near overhead power lines to eliminate the danger.

- a. The contractor and subcontractors' employees shall exercise extreme caution when working with aerial lift devices, cranes, and other equipment that is operating near overhead electrical lines.
- b. The contractor's H&S Representative shall be made aware of any site-specific hazards such as voltage of electrical utility overhead power lines, adverse weather conditions, vehicle and pedestrian traffic, etc. No changes to work plans shall be made without the prior approval of the contractor's H&S Representative.
- c. The work site shall be barricaded with appropriate signage and perimeter guarding in accordance with Section 6.3.
- d. A minimum safe distance from electrical utility overhead power lines and un-insulated, exposed and energized parts (e.g., transformers and capacitors) shall be maintained at all times.
- e. An appropriate safe distance defined by local rules and regulations shall be maintained.
- f. If the minimum distance listed above cannot be maintained, the Contractor's H&S representative shall specify the appropriate procedures and precautions that may include:
 - i. A pre-job meeting shall be held before each work shift to make sure all options to ensure safety are covered and that all personnel on the work site are informed as to the work safety plan and understand how to comply with it.
 - ii. The use of insulating gloves, blankets, or covers.
 - iii. An observer when equipment is within the touch potential of exposed energized overhead lines.

6.8 Safe Operation of Mechanical & Electrical Equipment

Operating mechanical and electrical equipment in a safe way is necessary in the workplace. NEC requires the Contractor to manage the risks associated with its use by identifying machinery and equipment hazards in the workplace and eliminating or reducing the risk of those hazards than can cause harm.

- a. The contractor shall instruct and train its employees in the safe operating procedures and hazards of all mechanical and electrical equipment. Training shall be

- documented and conducted in accordance with applicable H&S laws and regulations.
- b. The contractor shall provide evidence of the certification, either academic or issued by government or duly recognized institution as related to its Powered Industrial Lift Truck, forklift and Mobile Elevated Work Platform (MEWP) or any other mechanical and electrical equipment.
 - c. All mechanical and electrical equipment shall be operated and maintained according to the manufacturer's recommendations.
 - d. All mechanical and electrical equipment shall have a calibration / inspection due date which is visible to the user. Documentation shall be available that demonstrates that mechanical and electrical equipment has been calibrated / inspected. All mechanical and electrical equipment shall be inspected before each use. The equipment shall not be used unless it is found to be free of defects that would affect its safe use.

6.9 Rigging Operations

Improper rigging of a load or a rigging failure can expose riggers and other workers nearby to a variety of potential hazards, including riggers' being injured or killed when loads have slipped from the rigging or the rigging has failed.

NEC requires the Contractor for the measures to eliminate these dangers.

- a. Rigging equipment shall be adequate for the type of lift.
- b. Manufacturer's operating manuals shall be kept at the worksite for cranes, hoists and gin poles.
- c. Rigging equipment shall have a unique identification number that is traceable to the manufacturer and an inspection due date, both of which are traceable via a lifting register. Documentation shall be available that demonstrates that rigging equipment has been inspected. Rigging equipment shall be inspected at a frequency stipulated by the manufacturer (more frequently if specified locally) and prior to each use.
- d. Employees shall be trained in the proper use of rigging equipment.

6.10 Crane Operation

In addition to rigging operations, cranes need particular attention paid to their operation, as overhead electrical hazards can be fatal.

NEC requires the Contractor to properly plan and operate cranes.

- a. Crane operators shall be trained and also licensed / certified, as per local requirements. Documentation of training and licensing/certification shall be made available upon request.
- b. The crane operator shall inspect the crane, rigging and the area of the lift before commencing operation. Both daily and all other applicable frequencies of crane

inspection documentation shall be made available upon request.

- c. Power lines
 - i. Take precautions to maintain clearance distances from power lines as required by country, state and local standards. The crane operator shall identify the work zone by marking boundaries (such as with flags or a device such as a range limit device or range control warning device) and not operate the equipment past those boundaries.
 - ii. Equipment operations within minimum clearance distances of a power line are strictly prohibited except where the mobile crane supplier demonstrates that all country, state and local regulations are met.
- d. Communication
 - i. A pre-lift meeting shall be held so that all parties involved in the lifting operation, including crane operator(s), riggers, signal persons, employees on personnel lift platforms and supervisors have a thorough understanding of how communication will take place. A single person should be designated to direct all operations during the lift.
 - ii. A signal person for a mobile crane shall be provided where:
 - The load travel or the area at load placement is not in full view of the operator,
 - When the equipment is traveling, the view in the direction of travel is obstructed,
 - Due to site specific safety concerns, either the operator or the person handling the load determines it is necessary.

Signal persons shall be trained and documentation of that training shall be made available upon request.

- e. A lifting plan shall be prepared and made available for all lifts. The lifting plan shall include items necessary to address the special conditions of each lift. These items shall include but not be limited to, the total load weight to be lifted, crane placement location, required crane configuration, sling and rigging selection, and diagrams of lifting area dimensions.
- f. Personnel Lifting Systems utilizing either suspended or boom-attached personnel platforms shall comply with country, state and local requirements.
 - i. A trial lift with the unoccupied personnel lift platform loaded at least to the anticipated lift weight shall be made from ground level, or any other location where employees will enter the platform, to each location at which the platform is to be hoisted and positioned.

- ii. Both daily and all other applicable frequencies of inspections of personnel lift platforms shall be made available upon request.
- iii. Prepare and document a Personnel Lift Plan as required by country, state and local requirements.
- g. The crane's load chart shall be available. The load chart specifies the rated (maximum) capacity of that machine for every permissible configuration as well as the machine's operational limitations and conditions necessary for safe operation.
- h. Loads are never to be hoisted or moved over workers within the crane's swing radius.
- i. All personnel shall be kept clear of loads about to be lifted and of suspended loads.
- j. The area within the swing radius of the crane's superstructure shall be barricaded.

6.11 Excavation and Trenching

Trenching and excavation work presents serious hazards to all workers involved. Cave-ins pose the greatest risk and are more likely than some other excavation-related incidents to result in worker fatalities.

NEC requires the Contractor to have adequate protections in place by identifying excavation and trenching hazards.

- a. The contractor shall identify any potential hazards, including, but not limited to, the location of existing underground utilities, and obtain all required approvals before beginning any excavation, trenching, or other digging operations. This requirement includes following all of the applicable national, state, and local laws, including, but not limited to, any notice requirements and securing the services of location services.
- b. In the absence of national, state, or local laws or industry standards, the following shall apply to all excavations or trenches greater than 1.5 meters deep⁴ into which workers will enter:
 - i. The trench or excavation must be shored, sloped, braced, or otherwise supported to prevent cave-ins, unless the excavation is in stable rock.
 - ii. Ladders must be placed no more than 8 meters apart⁴, for immediate egress.
 - iii. Tools, machines, or excavated material must be placed no closer than 60 centimetres from the edge of a trench excavation and 1.2m from any other excavation⁵.
 - iv. Adequate ventilation must be ensured when operating equipment with internal combustion engines.

⁴ Standards - 29 CFR [1926.651\(c\)\(2\)](#)

[https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10775#1926.651\(c\)\(2\)](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10775#1926.651(c)(2))

⁵ 20.90 Excavated materials, Regulation Part 20 Construction, Excavation and Demolition

<http://www2.worksafefbc.com/Publications/OHSRegulation/part20.asp>

- c. For mechanical trenching, specific documented safety controls shall be developed and implemented to protect the ground employees working in close proximity to the Chain or Rock Wheel of the Trenching Equipment.
- d. For Horizontal Directional Drilling the following is mandatory:
 - i. Workers must understand and have knowledge of the locations of underground utilities.
 - ii. A clear communication between the Supervisor and Drilling Operators shall be established to avoid impacting existing utilities infrastructure.
 - iii. The crew shall adopt an electromagnetic tracking device to avoid disrupting existing utilities.
 - iv. Additionally, particular attention to pipe coupling and decoupling shall be implemented.
- e. Compressed air is frequently used when dropping cable inside the piping. Safety procedures on working with compressed air shall be documented and adopted by the contractors' employees performing this task.
- f. Appropriate warning signs, barricades, and other perimeter guarding shall be used to prevent workers and members of the public from falling into the excavation.
- g. If, during the excavation, unknown materials are unearthed, the contractor must stop the work immediately, notify their H&S representative, determine the nature of the materials, and take the appropriate measures to protect human health and the environment before proceeding. Measures taken must be in accordance with applicable H&S laws and regulations.

6.12 Fall Protection, Tower Climbing & Ladder Safety

Falling from height is the most common accident in telecommunications installation and commissioning activities.

NEC requires the Contractor to take appropriate precautionary measures.

- a. Fall protection shall be utilized whenever workers are exposed to the potential of falling.
- b. Fall protection may be accomplished by using appropriately supported guardrails, parapets of 1 meter or higher⁶, safety nets, or personal fall arrest systems. Examples of jobs where fall protection shall be used includes, but is not limited to:
 - i. Tower climbing - no free climbing is ever permitted; 100% attachment is required at all times.

⁶ 29 CFR* 1926.502(b)(1),

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10758

- ii. Roof top work within 2 meters of an unprotected edge⁷; Aerial lifts such as scissor lifts (when side railing is not secured/in place), boom lifts or bucket trucks are required.
- iii. Climbing fixed ladders.
- c. Anyone found not utilizing a fall arrest system and / or not wearing the appropriate PPE where required, shall be immediately removed from the worksite. The contractor site supervisor may also be removed from the project, depending on the circumstances. In the event of such an incident, the contractor must prepare and implement a corrective action plan.
- d. Where personal fall arrest systems are required, the contractor shall provide:
 - i. A competent person on the work site who is able to recognize fall hazards and take necessary corrective actions;
 - ii. A full body harness, shock absorber, lanyard or lifeline, double-locking hardware, and other equipment suitable for the nature of the work;
 - iii. Training to all fall protection system users;
 - iv. Tower climbers must have received training on tower climbing and rescue from a recognized training provider. Training certifications must not be older than 3 years unless the training provider specifies otherwise, or a shorter refresher cycle is locally required. Evidence of training certification must be maintained at the worksite and must be provided to NEC upon request.
 - v. Inspection of Personal Fall Arrest System components shall be conducted prior to each day's use; defective equipment shall not be used and shall be recovered and withdrawn.
 - vi. A minimum of two certified tower climbers shall be at each site, unless special arrangements have been approved by the NEC H&S Representative.
 - vii. The following conditions must be met when only one certified tower climber at the site has been approved by the NEC H&S Representative :
 - A second person to be permanently available for surveillance and be able to call for emergency services in the event of an accident.
 - Persons providing surveillance must receive a Fall Protection and Tower Climbing Awareness briefing.
 - All personnel supporting such operations will be required to be certified in First Aid at height and CPR by a recognized training provider.
 - If required by local regulations, Emergency Services to be notified of a Tower Climbing Operation prior to start.

⁷ Health and safety in roof work (ISBN 978 0 7176 6250 0) <http://www.hse.gov.uk/pubns/books/hsg33.htm>

- viii. An Emergency Action Plan applicable to the operation requiring the need to wear Fall Protection Equipment shall be created.

Adverse weather conditions, such as heavy rain and / or gusting wind, shall be evaluated prior to climbing. If the climbers are of the opinion that climbing would be unsafe, work is to be suspended until conditions improve.

- e. When using ladders, the following practices shall be followed:
 - i. All ladders shall be inspected and shall be in good condition prior to each use;
 - ii. Ladders must be made of nonconductive material (i.e., wood, or fiberglass with a plastic top) if being used where the person on the ladder or the ladder could come in contact with energized equipment parts/components, fixtures or circuit conductors;
 - iii. Stepladders shall be used only in the fully opened, locked position;
 - iv. All ladder feet shall be positioned on secure, even surfaces; and
 - v. All employees that use ladders shall be instructed in the proper use of ladders.
 - vi. Use of personal fall protection equipment is not required while using portable ladders unless stipulated by local rules and regulations.

6.13 Work at Height

The Contractor shall engage only properly trained and certified climbers who are fully aware of and knowledgeable about the inherent dangers of climbing or working above ground level, especially with regard to tower structures.

The climber's training and knowledge shall include:

- i. The nature of fall hazards in the work area;
- ii. The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used;
- iii. The correct procedures for inspecting personal fall protection equipment for wear, damage, defect or deterioration;
- iv. Climbing safety procedures;
- v. The use and operation of the fall protection systems utilized by the contractor/lower tier contractor;
- vi. The role of each employee in the safety monitoring system used;
- vii. The correct procedures for handling and storing equipment and materials ;
- viii. The role of employees in fall protection plans; and

- ix. The compatibility of fall protection equipment and fall protection systems
- x. Hands-on field exercise that will cover climbing, repositioning, and rescue on the type of elevated structures tower climbers will encounter in the field.

The performance of any Work at Height by any contractor's or its lower tier contractor's employee's or agents (i) who have not made the above representations, and (ii) who have not been properly trained as qualified climbers in accordance with this subsection, shall constitute a material breach of this Agreement. Upon such a material breach, NEC shall have the right to immediately terminate this Agreement and the contractor shall be liable to NEC for any damages and costs it incurred as the result of said termination.

6.14 Fire Protection

NEC requires the Contractor to take appropriate precautionary measures for fire extinguishers.

- a. Suitable fire extinguishers shall be available for hot work operations capable of starting a fire, such as welding, torch cutting, riveting, use of fuel powered machinery, saw cutting, grinding, soldering, brazing, etc.
- b. Fire extinguishers should be inspected regularly and maintained and used as per manufacturer's recommendations and applicable H&S laws and regulations. Training in the use of fire extinguishers may be required by applicable H&S laws and regulations.
- c. Access to wall mounted fire extinguishers and fire alarm / pull stations shall be maintained free of obstruction.
- d. Keeping fire doors open and disabling fire alarms / panels, smoke detectors, heat detectors and sprinkler systems is not permitted unless authorized by an NEC and / or customer premises representative.
- e. A work permit system is required for hot work.

6.15 Waste and Hazardous Waste

A number of waste categories can be produced at installation sites, such as industrial waste, e.g. sludge, waste oil, waste acid, waste plastics, etc. and special industrial wastes, e.g. PCBs, asbestos and other hazardous and toxic wastes.

IT equipment, waste cables, PCB's and fluorescent lamps may contain mercury, cadmium, lead, chromium VI, flame retardants and other hazardous and toxic chemicals, which pose risks to health of workers and the environment.

NEC requires the Contractor to select only appropriately licensed and authorised suppliers for the category and type of waste they are contracted to handle.

- a. Waste generated, as a result of construction activity / site installation / maintenance activity, in NEC and customer premises must be managed in compliance with applicable regulatory provisions.

- b. When requesting the hazardous wastes collection and / or treatment, the Contractor shall have a consignment agreement with a qualified waste collector and / or a treatment company.
- c. If the work being performed requires the applicable NEC entity to take ownership or arrange for the disposal of hazardous waste or electronic scrap, the Contractor shall contact the NEC representative for guidance in selecting NEC approved waste / scrap processing suppliers.

6.16 Radio Frequency (“RF”) Safety

In workplace environments near high-powered RF sources, the recommended limits for safe exposure of human beings to RF energy could be exceeded, which is very harmful to human beings.

NEC requires the Contractor to take restrictive measures and / or mitigation actions to ensure the safe use of RF energy.

- a. The Contractor or Contractor’s personnel shall have and maintain an RF Safety Program, including RF training, if workers are operating in an RF environment.
- b. The pre-job risk assessment should include evaluating potential exposure to RF.
- c. Only trained workers may work around transmitting antennas.
- d. Visually assess types and mounting location of transmitting antennas at worksite and identify transmitting antennas when possible, taking into account that there is no RF risk associated with “Receive Only” or non-operational antennas.
- e. Instructions on all RF warning signs/labels/placards must be obeyed.
- f. Whenever possible, never work directly in the compliance boundary or in front of an active antenna or within the “Stand-Off Distance.”
- g. If operations need to be performed within the compliance boundary, within the “Stand-Off Distance,” or on or in front of a transmitting antenna, request the customer to switch off transmission following the customer’s lock-out / tag-out procedures.
- h. If the above-mentioned lock-out / tag-out is not possible, workers must wear personal RF monitoring equipment to ensure RF exposure is below the MPE during the worker’s operation. The H&S representative may allow the worker to operate under certain conditions provided their potential exposure can be maintained below the MPEs recognized by applicable H&S laws and regulations. RF monitoring equipment must be calibrated and used in accordance with the manufacturer’s instructions. Any additional RF assessments shall be made available to the applicable NEC upon request.

6.17 Road Safety

While driving motor vehicles on company business such as cars, off road vehicles or motorcycles, NEC requires the contractor to ensure that employees operating vehicles:

- i. Possess a valid driver's license and be medically fit to drive;
- ii. Comply with all applicable local traffic laws and regulations;
- iii. Wear safety belts while driving or riding in a motor vehicle and ensure that all passengers wear safety belts;
- iv. Not use a mobile phone unless the vehicle is parked or in a hands-free mode where allowed by local laws;
- v. Not drive a vehicle if fatigued, in order to prevent drowsy driving;
- vi. Not transport passengers in the back of pick-up trucks;

And shall not drive a motor vehicle while under the influence of drugs or alcohol.

All supervisors of employees who drive motor vehicles on company business shall:

- i. Ensure drivers designated to operate regular or commercial vehicles requiring special training, license and/or medical surveillance applicable to vehicles size and use are up-to-date;
- ii. Ensure all required vehicle documents are up to date (e.g., vehicle registration and insurance);
- iii. Ensure that all vehicles undergo preventive maintenance schedule according to the manufacturer's specifications, ensuring that all deficiencies are corrected and applicable records are kept.

7. Supplier Personnel

To comply with the applicable laws and regulations and take necessary precautionary measures to eliminate the hazards and risks in the workplace, NEC requires the Contractor to select suitable subcontractors in a defined manner.

- a. The contractor shall request permission from NEC before using subcontractors, unless they satisfy the following b. requirement.
- b. Temporary employees and subcontractors hired by the contractor shall:
 - i. be knowledgeable of the contractor's, customer's and NEC H&S requirements;
 - ii. have all required H&S training, as per 4.2
 - iii. have and use required PPE, as per 6.5
- c. The contractor shall have a pre-qualification process that is to be used in the selection of their contractors (at any tier).

- d. H&S performance requirements shall be considered and used in their contractor selection criteria.
- e. Contractor selection should be based upon acceptable responses.
- f. Once selected, the requirements outlined in this manual shall be communicated and the subcontractor's H&S performance monitored by H&S jobsite inspections. Such documentation should be provided to NEC upon request.