

# NC State University Design and Construction Guidelines

## Division 01 Contractor Safety Requirements

### 1.0 Purpose

- A. The purpose of this guideline is to define NC State contractor safety requirements. This guideline is intended to be a supplement to the General Conditions of the contract.
- B. The Designer shall incorporate this document into the specification in its entirety.

### 2.0 Reference Materials

- A. The following reference materials are required to be on every job site:
  - 1. NC State Environmental Health and Safety Manual  
[http://www.ncsu.edu/ehs/healthsafety\\_man.htm](http://www.ncsu.edu/ehs/healthsafety_man.htm)
  - 2. OSHA Regulations published by NC Department of Labor (DOL) (Available at: (800) NC-LABOR, <http://www.nclabor.com/pubs.htm> ).
  - 3. Material Safety Data Sheets (MSDS) for all chemical products the contractor has brought to the worksite.
  - 4. The written safety plan of the Contractor or Subcontractor.

### 3.0 General Requirements

- A. Contractor Responsibilities. The contractor must notify NC State prior to:
  - 1. Performing blasting operations or use of powder-actuated tools
  - 2. Starting operations that will produce excessive odor, dust, noise affecting occupied building or work near air intakes
  - 3. Using a combustion engine indoors
  - 4. Air lifts with cranes, derricks, or hoists
  - 5. Breaking ground for an excavation or trench
  - 6. Using a laser
  - 7. Using any source of radioactive material
  - 8. Working with lead or asbestos containing materials

**Violation of any safety, security, or environmental guidelines may result in the permanent removal of the contractor or their employees from the NC State premises.**

- B. Hot Work Permits - A Hot Work Permit is required when any indoor or outdoor work will involve hot work, defined as use of flame, welding, soldering, cutting, brazing, grinding that causes sparks, use of asphalt or tar kettles, or other work that might create sufficient heat or spark to start a fire. Requirements for Contractors performing this work are contained in a 4-page document entitled “Hot Work Program” that is a part of

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the specifications package and can also be found at  
[http://www.ncsu.edu/ehs/fire/hot\\_work.htm](http://www.ncsu.edu/ehs/fire/hot_work.htm).

- C. Contractor Safety Representative
  1. The Contractor shall perform daily job inspections and correct any unsafe conditions.
  2. Any accidents or near misses must be reported and investigated with the results given to NC State.
  3. The Contractor shall address safety at regularly scheduled meetings with subcontractors.
  
- D. Contractor Safety Plan - The Contractor must develop and implement a comprehensive safety plan for his or her employees, which covers all aspects of onsite construction operations and activities associated with the contract. This plan must comply with all applicable health and safety regulations and any project-specific requirements.

### 4.0 Contractor's Safety Reference Appendix

- A. All contractors and their employees must adhere to OSHA Regulations and the NC State Environmental Health and Safety Manual.
  
- B. Air Tools
  1. All hand and power tools and similar equipment, whether furnished by the employer or the employee, shall be maintained in a safe condition. Any tool found not in proper working order, or that develops a defect during use, shall be immediately removed from service and not used until properly repaired.
  2. All tools shall be used operated and maintained in accordance with OSHA and manufacturer requirements.
  
- C. Asbestos - If asbestos-containing materials are uncovered during construction, NC State must be notified *immediately*. Do *not* attempt to remove the material.
  
- D. Barricades and Guardrails
  1. Hazardous areas must be cordoned off with barricades or DANGER TAPE to warn workers and non-construction related traffic.
  2. When barricades, guardrails or opening covers must be removed for work to proceed, workers must be protected by a safety harness and lanyard tied off to a substantial structure member.
  3. Barricades, guardrails and covers must be replaced immediately at the end of the work shift.

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### E. Compressed Gas Cylinders

1. Valve protection caps must be in place when compressed gas cylinders are transported, moved, or stored.
2. Cylinder valves must be closed when work is finished and when cylinders are empty or moved.
3. All compressed gas cylinders must be secured by chains, straps, or a rigid retaining bar or structure in an upright position at all times. Compressed gas cylinder shall be secured on an approved carrier while being transported.
4. Cylinders must be kept at a safe distance or shielded from welding or cutting operations.
5. Cylinders must not be placed where they can contact an electrical circuit.
6. The proper regulator is required to reduce compressed gases to a safe operating pressure.
7. Oxygen and fuel gas regulators must be in proper working order while in use. Back-flow check valves must be installed either at the regulator or the operation torch.
8. If a leak develops in a cylinder and it cannot be immediately corrected, the cylinder must be removed to a safe location outside of the building. If ignition source is flammable gas, call 911 and notify NC State.
9. Cylinders will be permanently marked, stenciled, or tagged to identify the “type of gas in the cylinder” per ANSI Standards. The name of the owner of the cylinder must be displayed.

### F. Confined Space Entry

1. An OSHA *Permit-Required* Confined Space (PRCS) is a confined space that has one or more of the following characteristics:
  - a) Contains or has the potential to contain a hazardous atmosphere.
  - b) Contains a material that has the potential for engulfing an entrant.
  - c) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a small cross section.
  - d) Contains any other recognized serious safety or health hazard.
2. All contractors required to enter a NC State confined space must follow procedures found at <http://www.ncsu.edu/ehs/www99/right/handsMan/confined/confined1.htm>.

### G. Contaminated Soil - If soil or any materials appear to be contaminated notify NC State.

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- H. Cranes, Derricks and Hoists - Notify NC State ten (10) working days prior to the use of cranes.
- I. Electrical
  - 1. Any circuit to be worked on or connected to equipment to be worked on which is capable of being energized must be deenergized and Locked Out and Tagged prior to work. All electrical installations must comply with the requirements of the NEC.
  - 2. Contractor will follow all requirements as noted in NFPA 70E.
- J. Electrical Power Lines (Overhead) - The contractor shall have a trained and knowledgeable observer (flagmen) within sight of the operator and the overhead lines that will effectively provide guidance and clearance information to the operator as the equipment may approach the minimum approach distances. Advising the operator shall be the flagmen's one and only task. When conducting any work with a crane, derrick or hoist in the vicinity of any overhead electric power transmission or distribution line, the contractor shall observe all clearance requirements dictated by all applicable OSHA rules, as specifically contained within 29 CFR 1910 - Standards for General Industry, CFR 1926 - Standards for Construction, IEEE C2 - NEC, NFPA 70 - NEC, the NCSBC, ANSI standards and other applicable NC State safety guidelines and requirements. Further, no crane, derrick or hoist operator or contractor shall conduct any operation at any distance closer than 16 feet to any electric power transmission line lower than 200 kV or closer than 23 feet to any electric power transmission line at voltages higher than 200 kV and lower than 250 kV. Such distances shall be measured from the nearest boundary of the work zone to the nearest conductor, in a straight line.
- K. Elevators/Material Hoists
  - 1. Any persons operating elevators/hoists must be trained to do so. Documentation shall be kept onsite.
  - 2. No elevator/hoist with a defect shall be used.
  - 3. Elevator/hoist safety devices shall not be overridden or made inoperable.
- L. Emergency Equipment- The following shall not be moved, blocked, disabled or rendered inaccessible unless authorized by NC State:
  - 1. Fire equipment
  - 2. First aid equipment, fire blankets, stretchers, eyewash fountains and safety showers.
  - 3. Fire protection and detection systems.

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- M. Emergency Medical Treatment - To receive the immediate assistance for emergency medical treatment call 911.
  
- N. Environmental and Chemical Requirements
  - 1. Contractors must provide NC State with a list of all chemicals to be used on NC State property and maintain a copy on site of the MSDS (OSHA Form 20 or equivalent) for each chemical prior to being brought on site. Each chemical container must be labeled *clearly* with the identity of the chemical and any associated hazards.
  - 2. Contractors must follow the safety procedures recommended by the manufacturer or seller of any chemicals, tools, equipment, or other materials. Contractors are to remove all empty containers, excess chemicals and chemical waste from NC State property.
  - 3. For all chemical incidents, contractor shall call 911 and notify NC State.
  
- O. Excavation and Trenches - Before doing any excavation work, the Contractor must locate all utilities by calling the local utility locator service and NC State.
  
- P. Excavating Equipment
  - 1. Seat belts shall be provided on all equipment covered by this section and shall meet the requirements of the Society of Automotive Engineers.
  - 2. Rollover protective structures (ROPS) and supporting attachment shall meet the minimum criteria detailed in OSHA.
  - 3. All earthmoving equipment shall have a service braking system capable of stopping and holding the equipment fully loaded, as specified by the Society of Automotive Engineers.
  - 4. All bidirectional machines, such as earthmoving or compacting equipment, and similar equipment, shall be equipped with a signal alarm at an audible level, distinguishable from the surrounding noise, which is operational when the machine is moving in either direction.
  - 5. Unauthorized personnel shall not be permitted to ride on powered industrial trucks.
  
- Q. Exit Routes
  - 1. Exit routes must be maintained at all times during construction.
  - 2. Lighting and marking must be adequate and appropriate.
  - 3. An employee alarm system must be operable.
  - 4. Exit routes must be kept free of explosive or highly flammable furnishings.

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5. Exit routes must be free and unobstructed. No materials or equipment may be placed, either permanently or temporarily, within the exit route. The exit access must not go through a room that can be locked, such as a bathroom, to reach an exit or exit discharge, nor may it lead into a dead-end corridor. Stairs or a ramp must be provided where the exit route is not substantially level. No materials shall be stored in a stairwell.

### R. Explosives

1. Generally, the use of explosives is not allowed on NC State construction projects.
2. In the exceptional event that explosives are allowed, blasting must comply with the appropriate OSHA regulations.
3. A blasting plan must be provided to, reviewed by and approved in writing by NC State.

### S. Fall Protection

1. Contractors shall provide and install all fall arrest protection systems as required by OSHA.
2. The contractor shall provide training requirements to each employee who might be exposed to fall hazards.

### T. Fire Protection and Prevention

1. The contractor shall be responsible for the development and maintenance of an effective fire protection and prevention program at the job site throughout all phases of the construction. Contractors shall perform inspections on fire extinguishers monthly. Contractors shall immediately replace fire extinguishers that do not pass inspection.
2. Fire cutoffs shall be retained in buildings undergoing alterations or demolition until operations necessitate their removal.
3. If work requires the disabling of Fire Protection Devices, then the Contractor must request a Fire Alarm Disconnect from No alarm shall be disabled at anytime by the Contractor.

### U. Floor Openings, Hatchways

1. Every hatchway and chute floor opening shall be protected in accordance with OSHA regulations.
2. Where operating conditions necessitate the feeding of material into any hatchway or chute opening, protection shall be provided to prevent a person from falling through the opening.

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### V. Housekeeping

1. The Contractor must maintain a clean and orderly project job site. The Contractor shall maintain NC State's pathways free of rocks, mud, and other miscellaneous construction debris. The Contractor shall prevent the accumulation of dirt, dust, and / or other debris on NC State's roadways. The Contractor shall clean the travel ways on a daily basis. (Refer to project specifications for requirements.)
2. Waste material and debris must be removed from the work and access areas at least once a day. Waste material and debris should not be thrown from one level to another but should be carried down, lowered in containers or deposited in a disposal chute.
3. Materials must be neatly piled, stacked or otherwise stored to prevent tipping or collapsing. Materials must be carefully stacked and located so they do not block aisles, doors, fire extinguishers, safety showers and eye wash stations, fixed ladders or stairways.
4. Material to be lifted by crane or other hoisting devices must not be stored under overhead power lines.
5. No materials may be stored on penthouses, roofs, or other areas until a specific area is assigned by NC State for a specific project.

W. Illumination - Construction areas, ramps, runways, corridors, offices, shops, and storage areas shall be lit to not less than the minimum illumination intensities required by OSHA.

X. Ladders - All ladders must meet OSHA requirements.

### Y. Lasers

1. Lasers must comply with the OSHA Construction Industry Standards.
2. Lasers must be low power (<5mw) devices with visible beams. Lasers to be used must bear a label indicating this maximum power output. Lasers that do not bear this label shall not be used.
3. "Laser in use" signs shall be posted according to OSHA requirements.
4. Lasers must be used in a manner that will not risk exposure to others.

### Z. Lead

1. Lead may be found in certain painted surfaces. A check for lead presence should be conducted prior to certain activities such as grinding, sanding, or burning over painted surfaces. If lead containing paint is accidentally disturbed or a material is questionable NC State must be notified *immediately*. Do *not* attempt to remove the material.

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2. Hot Work over lead painted surfaces is generally not permitted.

### AA. Lifting

1. Before lifting the load, think of alternate means of moving it (push, pull, roll, pour or pump).
2. Have firm footing and make sure the standing surface is not slippery.
3. Keep your back straight by tucking your chin in.
4. Tighten your stomach muscles and lift with your legs.
5. Lift the load slowly. DO NOT JERK!
6. Hold the load as close to the body as possible. Be sure you position the load close to the body before lifting.
7. Do not twist during your lift or when moving the load. Turn with your feet, not with your back.
8. Set the load down gently. Use your legs and keep your back as straight as possible.
9. Be sure your fingers are out of the way when putting the load down and when moving the load through tight spaces.
10. Ask for help if you need it and use mechanical means wherever it's available.

### BB. Lock Out/Tag Out

1. All contractors that work on energized equipment with any hazardous energy source are required to deenergize and secure the source potential using a LOCKOUT / TAGOUT procedure as required by OSHA. Types of potential energy sources:
2. Electrical - This includes power supplies, batteries, capacitors and static electricity.
3. Hydraulic, air, gas pressure lines and vessels.
4. Thermal energy
5. Elevated materials, coiled springs

### CC. Noise/Vibration

1. Noise producing equipment, such as power drills, jackhammers, welders, etc., can create sound levels of 80dB(A) or greater in and around a construction area. Notify NC State in advance to determine the appropriate times to operate high noise/vibration equipment for that project's location.
2. Appropriate personal protective equipment shall be used when working around high noise/vibration equipment.



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### DD. Overhead Work

1. Work must not be performed above other personnel, including other contractor employees. Affected areas must be roped off or barricaded and marked to prohibit traffic.
2. Contractors must not climb on the heating and air-conditioning ductwork, plumbing steam piping, electrical cable trays, fixtures, or furniture or use as work platforms.
3. Contractors are expected to comply with OSHA fall protection requirements.

### EE. Paints and Solvents - Contractors must provide the following safeguards:

1. Adequate ventilation must be maintained at all times when paints or solvents are being used.
2. Contractor personnel must use proper respiratory protection and protective clothing when toxicity of the material requires such protection.
3. Flammable solvents and materials must be used with extreme caution when possible sources of ignition exist.
4. Flammable paints and solvents must be stored in an approved flammable liquid storage cabinet when storage is required inside buildings. Acids and flammables must never be stored together. If an approved flammable liquid storage cabinet is not available, flammable paints and solvents must be removed from the building.
5. Flammable liquids must be dispensed in a safety can with a flash screen bearing a Factory Mutual or Underwriters Laboratory (UL) approval.

### FF. Personal Protective Clothing and Equipment - Contractor shall determine this minimum level of protective equipment to be worn on the jobsite (example: hard hat, eye protection, safety vest, gloves and safety shoes). Any additional safety equipment required by a specific activity shall also be worn and shall meet or exceed OSHA standards.

### GG. Powder-Actuated Tools

1. Powder-actuated tools are not to be used on NC State property unless specific approval is obtained from NC State prior to usage.
2. If approved, powder-actuated tools must be used in accordance with OSHA and manufacturer regulations.

### HH. Power Vehicle Equipment

1. Only trained operators are allowed to use power vehicles on NC State property. Contractor management will be expected to provide proof of training if requested.

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2. Generally, LP gas powered trucks are not to be used inside NC State buildings. Prior approval from NC State is required.
3. The design of the LP gas fueled industrial truck for use within NC State buildings must comply with the following:
4. LP gas fueled industrial trucks must comply with NFPA 505-1982.
5. If trucks are continuous use in a populated area, they must be equipped with a catalytic converter.
6. LP gas containers must not exceed the nominal 45 pounds LP gas.
7. The following conditions and requirements will govern the use of LP gas fueled vehicles inside the confines of NC State buildings and structures:
8. LP gas fueled trucks must be removed from the building and parked at the end of each workday and not left unattended while in use. When the job requiring the truck is complete, the truck must be removed from the job site.
9. Trucks and tanks must not be refueled inside buildings.
10. All areas where LP gas fueled trucks are used must be well ventilated.
11. All LP cylinders must be stored outside and secured by a chain in an upright position.

### II. Roof Safety

1. The contractor shall request authorization from NC State prior to accessing a roof.
2. During all rooftop operations, the contractor must provide fall protection measures in accordance with OSHA.
3. Two appropriate fire extinguishers of the correct ABC type are required when performing hot work on roofs. Other persons acting as a Fire Watch shall be in place on the roof and on the floor(s) directly below operation.

### JJ. Sanitation

1. Drinking Water - An adequate supply of water, meeting the U.S. Public Health Service Drinking Water Standards, shall be provided.
2. Washing Facilities
  - a) The contractor shall provide adequate washing facilities for employees engaged in the application of paints, coating, herbicides, or insecticides, or in other operations where contaminants may be harmful to the employees. Such facilities shall be in near proximity to the worksite and shall be so equipped as to enable employees to remove such substances.
  - b) Hand soap or similar cleansing agents shall be provided.

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- c) Individual hand towels, cloth or paper, warm air blowers or clean individual sections of continuous cloth toweling, shall be provided.
  - 3. Toilet facilities shall be provided for employees according to the OSHA requirements.
- KK. Scaffoldings - Contractor shall erect, use and dismantle scaffolding in accordance with OSHA and manufacturer regulations.
- LL. Signs and Barriers
  - 1. Adequate signs and barriers shall be used where hazards exist.
  - 2. All holes shall be covered, secured, and properly marked.
- MM. Smoking and Open Flames
  - 1. Smoking is not allowed in any NC State buildings, including roofs, penthouses, electrical / mechanical rooms and basements.
  - 2. The use of open flames is strictly prohibited in areas where flammable liquids, gases, or highly combustible materials are stored, handled or processed.
  - 3. The use of open flames, where allowed, requires a Hot Work Permit.
- NN. Tarpaulins - When tarpaulins are required for the deflection of hot slag, dust, paint drippings, etc., or as a security barrier, they must be flame resistant and in good condition, free of holes and worn edges.
- OO. Tar Pots (tar kettles) - Tar Pots are not allowed on roofs. The contractor must notify NC State prior to using tar pots and obtain a Hot Work permit.
- PP. Temporary Heating - When heaters are used in confined spaces, special care shall be taken to provide sufficient ventilation in order to ensure proper combustion, maintain the health and safety of workmen, and limit temperature rise in the area.
- QQ. Temporary Lighting - Contractor shall submit a lighting plan for night work, underground work, and any other worksites without adequate lighting.
- RR. Vehicle Operation
  - 1. All equipment shall have operational backup alarms. Equipment shall not be utilized until such device is functioning properly.
  - 2. All vehicles shall be operated in accordance with OSHA and manufacturer regulations.

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- SS. Vertical Lifts - All contractors' platforms or vertical lifts must meet OSHA and manufacturer requirements.
- TT. Warning Signs
1. All traffic control shall be approved by NC State and meet the Institute for Transportation Research and Education (ITRE) Work Zone Safety Guidelines for Construction, Maintenance and Utility Operations.
  2. The contractor shall provide warning signs, barriers, barricades, etc., in accordance with the construction plans and specifications or whenever such protection is needed.
  3. Where signs and barricades do not provide adequate protection, particularly along a road, walkway, or main aisle, flagmen shall be used.
  4. Review with the crew, each person's responsibility regarding the traffic control set-up (e.g. sign installation, lane closure setup, etc.).
  5. Review traffic control devices to be used at the site. Assure that traffic control set-up is properly installed. Installer shall document what traffic control set-up was used (including the sign types and sign locations) and how it was installed.
- UU. Work Zone Tail Gate Safety Meetings - "Tailgate" or "toolbox" safety meetings shall be held at the beginning of each work period (normally in the morning before leaving the yard or work staging area) and led by a competent safety professional.