

CONSTRUCTION SAFETY

PURPOSE

The purpose of this policy is to comply with OSHA regulations and to maintain a safe working environment for the employees involved in construction.

INFORMATION SOURCES

The information in this document is from the Occupational Safety and Health Standards for the Construction Industry (29 CFR Part 1926). Parts of 29 CFR 1910 (General Industry Safety and Health Standards) which are applicable to construction are also used as information sources. Many requirements for construction safety are covered by other sections of this Safety Manual. The information presented in this section will deal solely with items not covered in other sections. Other sections of the Safety Manual are referenced.

ADMINISTRATIVE REQUIREMENTS

Requirements for construction dealing with administrative matters are covered in the Notices and Record keeping Policy of this Safety Manual.

GENERAL SAFETY AND HEALTH

During construction, scrap lumber and debris will be kept clear from work areas, passageways and stairs. Combustible scrap and debris will be removed at regular intervals. Containers will be provided for waste disposal. Garbage that is hazardous or flammable will be in containers with lids.

MEDICAL SERVICES, FIRST AID AND SANITATION

Requirements dealing with medical services, first aid and sanitation are covered in the Facilities Safety and Emergency Response sections of this Safety Manual.

ASBESTOS

The regulations covering asbestos also include tremolite, anthophyllite and actinolite.

Permissible Exposure Limits (PEL): No employee will be exposed to more than .02 fibers per cubic centimeter of air as an eight hour time weighted average (T.W.A.). 1926.58 Appendix A gives the proper methods for determining this.

Excursion Limit: No employee will be exposed to more than 1.0 fiber per cubic centimeter of air as averaged over a sampling period of thirty minutes.

On work sites where outside employers are working, they must be informed of the work being done with asbestos.

When a T.W.A. or excursion limit is exceeded, a regulated work area must be established and all requirements for working in such an area must be met. When a hazardous environment exists the Safety Coordinator will be contacted.

Monitoring: When work is being done with asbestos, the air will be tested before work begins and then on a daily basis unless workers are equipped with supplied air respirators. Monitoring will be done following the procedures in 1926.58 Appendix A.

Engineering controls which can be used to meet T.W.A. and excursion limits are:

- -local exhaust ventilation with HEPA filter dust collection system
- -general ventilation systems
- -vacuum cleaners equipped with HEPA filters
- -enclose or isolate a process producing asbestos dust
- -use of wet methods
- -prompt disposal of asbestos waste in leak-tight containers.

Respirator protection from contaminated and hazardous atmospheres is covered in the Respiratory Protection section of this Safety Manual.

Protective clothing will be provided when necessary for working with asbestos. The County will provide for the safe laundering of the protective clothing. Contaminated clothing will be transported in sealed impermeable bags or other containers and will be labeled appropriately. Clean change areas with separate storage facilities for protective and street clothing will be provided.

When necessary, the County will provide a lunch area away from the regulated area and also a decontamination area.

Warning signs will be used to mark locations where work is being done with asbestos. The signs will read:

DANGER
ASBESTOS - CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATOR AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA.

Labels will be attached to all products and containers with asbestos including waste containers. The labeling and training will follow the regulations outlined in the Hazard Communications section of this Manual.

Physical examinations will be provided by the County to determine if it is appropriate for an employee to wear respiratory protection and can perform the work. See the Respiratory Protection section of this Manual for details and forms.

HAZARD COMMUNICATION

The policies for Hazard Communication are described in the Hazard Communication section of this Manual including listing of hazardous materials, SDS notebooks and their availability, labeling and training of employees.

PERSONAL PROTECTIVE EQUIPMENT

Hard hats will be worn at all times where there is a possible danger of head injury from impact, falling or flying objects or electrical shock and burns.

Employees will be provided with eye and face protection when machines or operations present potential eye or face injury from physical, chemical or radiation agents.

Safety nets will be provided when work areas are more than 25 feet above the ground or water surface and the use of ladders, scaffolds, catch platforms, temporary floors, safety lines or safety belts is not practical.

FIRE PROTECTION AND PREVENTION

Policies for fire protection and prevention are included in the Emergency / Fire Plan section of this Manual.

SIGNS, SIGNALS AND BARRICADES

Signs will be visible at all times when work is being performed and will be removed or covered promptly when the hazards no longer exist.

Danger signs are used only where there is an immediate hazard.

Caution signs are used to warn against potential hazards or to caution against unsafe practices. All signs used will be OSHA approved.

Accident prevention tags will be used as a temporary means of warning employees of an existing hazard (such as defective tools or equipment).

Signals for traffic directing will be done with flags (at least 18 inches square), sign paddles, or red lights for darkness. Flagmen will be provided with red or orange vests, which will be reflective if worn at night.

Barricades will conform to the American National Standards Institute Manual on Uniform Traffic Control Devices for Streets and Highways.

MATERIALS STORAGE, HANDLING, DISPOSAL

Materials which are stored in tiers (stacked, racked, blocked, interlocked or otherwise) will be secured to prevent sliding, falling or collapse.

Materials will be stored more than 6 feet from any hoist way or inside floor opening and more than 10 feet from any exterior walls that do not extend above the top of the materials.

Aisle and passageways will be kept clear and in good repair.

All scrap lumber, waste material and rubbish will be removed from the immediate work area as the work progresses. Disposal of waste material or debris by burning will comply with local fire regulations. All solvent waste, oily rags and flammable liquids will be kept in fire resistant covered containers until removed from the worksite.

Rigging such as alloy steel chain slings will have a permanently attached durable identification stating size, grade, capacity, and manufacturer. All hooks, rings, oblong links, pear shaped links, coupling links, and other attachments will have a rated capacity at least that of the chain. Job or shop hooks and links or makeshift fasteners are not to be used. All rigging equipment for material handling will be inspected prior to use on each shift. When forming eyes in wire rope, U-bolt clips will be properly spaced and installed.

TOOLS

All hand and power tools furnished by the County or its employees will be maintained in a safe condition. The belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, and chains will be properly guarded on all tools and equipment. All electric power tools will be equipped with proper ground or will be double insulated. All portable circular saws will have guard above the base plate and a guard below the base plate that will automatically and instantly return to the covering position when the saw is withdrawn from the work. The Facilities Safety section of this Safety Manual covers other areas of power hand tools and machine guarding.

WELDING AND CUTTING - SEE FACILITIES SAFETY.

ELECTRICAL/LOCKOUT/ TAGOUT - SEE FACILITIES SAFETY.

FLOOR AND WALL OPENINGS - SEE FACILITIES SAFETY.**SCAFFOLDING**

All scaffolding will be erected in agreement with the requirements of the regulations as follows:

1. The footing or anchorage will be sound, rigid and capable of supporting the maximum intended load without settling or displacement.
2. Guardrail and toe board will be installed on all open sides and ends of platforms more than 10 feet above the ground or floor.
3. Scaffolds 4 to 10 feet in height, with a minimum horizontal dimension in either direction of less than 45 inches, will have standard guardrail on all open sided and ends of the platform.
4. Scaffolds will be capable of supporting at least four times their maximum intended load.
5. Scaffold planks will extend over their end supports not less than 6 inches and not more than 12 inches.
6. Manually propelled mobile scaffolds will be erected so that their height is no more than 4 times the minimum base dimension.
7. Casters or wheels on mobile scaffolds will be locked while in use by any person.
8. All two point suspended scaffolds suspended by wire, synthetic, or fiber ropes will be capable of supporting at least 6 times the rated load.
9. All ropes, slings, hangers, platforms, and other supporting parts of two pint suspended scaffolds will be inspected before every installation.
10. All employees on two point suspended scaffolds will be protected by a lifeline and safety belt.

CRANES, DERRICKS, HOISTS, ELEVATORS AND CONVEYORS

1. Employees will follow the manufacturer's specifications and limitations for all cranes and derricks.
2. Rated load capacities, recommended operating speeds, and special hazard warnings will be posted on all equipment and will be visible from the operator's station.
3. Equipment will be inspected by a Competent Person before each use.
4. Thorough annual inspections will be made on hoisting machinery and records of the dates and results of inspection will be maintained by the Facilities Maintenance Director.
5. Accessible areas within the swing radius of the rear rotating superstructure of a crane must be barricaded to prevent an employee from being struck or crushed.
6. Before leaving the crane unattended, the boom will be lowered to the ground level or otherwise securely fastened.
7. Booms which are being assembled or disassembled on the ground, with or without support of the boom harness, will be securely blocked to prevent dropping of the boom and boom sections.
8. Cranes and derricks will be only used to hoist employees on a personnel platform when conventional means are more hazardous or impossible.
9. If a personnel platform is to be used, all safety requirements must be met.
10. A crane or derrick used with a personnel platform will have a boom angle indicator, a device to indicate boom length, and an anti-two blocking device or two block damage prevention feature.
11. Personnel platforms will meet all design criteria and platform specifications required.
12. Before using a personnel platform, a trial lift, inspection and proof testing will be done.
13. All employees will be prohibited from riding on material hoists except for the purpose of inspection and maintenance.
14. Hoist way entrances will be protected by substantial gates or bars.
15. Hoist way doors and gates on personnel hoists will be at least 6 feet 6 inches high and will be provided with mechanical locks that cannot be operated from the landing side and will be accessible only to the person on the car.
16. Overhead protective coverings will be provided on top of hoist cages or platforms.
17. The safe working load of an overhead hoist will be indicated on the hoist and will not be exceeded during

- operation.
18. If a conveyor must pass over areas or aisles, guards will be provided to protect employees from falling materials.
 19. Conveyors will be equipped with warning signal that can be heard, and it will be sounded immediately before starting the conveyor.
 20. When employees are working from an aerial lift, body belts will be worn and a lanyard attached to the boom or the basket.

MOTOR VEHICLES, MECHANIZED EQUIPMENT – SEE THE FACILITIES SAFETY SECTION OF THIS MANUAL

EXCAVATIONS - SEE THE TRENCHING/EXCAVATION SECTION OF THIS MANUAL.

CONCRETE, CONCRETE FORMS AND SHORING

1. All protruding reinforced steel will be guarded to eliminate the hazard of impalement.
2. Employees will not ride in concrete buckets.
3. When placing or tying reinforcing steel more than 6 feet above adjacent working surface an employee will be protected by a safety belt.
4. Powered, rotating-type concrete trowels that are manually guided will have a control switch that automatically shuts off if the workers hands are removed from the handles.
5. All form work for cast-in-place concrete will be designed, fabricated erected, supported, braced and maintained so that it will support all loads that may be anticipated without failure.
6. Erected shoring equipment will be inspected immediately before, during and after concrete placement.
7. Forms and shores will be left in place until a supervisor determines that the concrete can support its weight and superimposed loads.
8. Precast concrete wall units, structural framing, and tilt up wall panels will be supported to prevent overturning and collapse until permanent connections are made.
9. Lift slab operations will be designed and planned by a qualified professional engineer or architect. Designs and plans will include prescribed methods of erection.
10. Jacking equipment will have a safety factor of 2.5. The maximum number of manually controlled jacks on one slab will be limited to 14. Jacking operations will be synchronized to insure even and uniform lifting. Only those employees required for jacking and to secure slabs will be permitted under the slab during jacking.
11. A limited access zone will be established when constructing a masonry wall. All masonry walls over 8 feet tall will be braced or supported to prevent collapse.

STEEL ERECTION

Safety nets or safety lines and harnesses will be used whenever the potential fall distance is more than 25 feet. The derrick or erection floor will be solidly planked except for access openings. Planking or decking will be of proper thickness to carry the work load. Planking will be at least two inches thick, full size undressed, and will be laid tight and secured to prevent movement.

A safety railing of 1/2 inch wire rope or equal will be installed approximately 42 inches high around the periphery of all temporary planked or temporary metal decked floors of tiered buildings and other multi-floored structures during structural steel assembly.

Where long span joints or trusses 40 feet or longer are used a center row of bolted bridging will be installed.

Tag lines will be used for controlling loads.

When bolting, riveting, or plumbing up, pneumatic hand tools will be disconnected and pressure lines will be released

before adjustments or repairs are made.

Locking devices will be provided to retain sockets on impact wrenches.

Precautions will be taken to prevent fires when riveting in the vicinity of combustible material,.

On pneumatic riveting hammers, the safety wire on the snap will be not less than number 14 wire, and not less than number 9 on the handle.

During plumbing up, the turnbuckles will be secured to prevent unwinding under stress. The plumbing guys and related equipment will be placed so that employees can reach connection points.

All employees will be provided with safety belts when working on float scaffolds. The planks will overlap the bearing on each end by a minimum of 12 inches. Wire mesh, exterior plywood, or the equivalent will be placed around columns where planks do not fit tightly. All unused openings in floors will be planked over or guarded.

TUNNELS AND SHAFTS

A safe means of access will be provided and maintained to all working areas dealing with underground construction. A check-in and check-out system will be used on the surface to keep an accurate record of each employee location. An emergency evacuation plan will be developed and made known to the employees. A competent person will be present at all times who will be familiar with all requirements in the sections concerning underground construction.

DEMOLITION

1. When there is a danger of falling through wall openings, the openings will be protected to a height of 42 inches.
2. If debris is dropped through holes in the floor without chutes, the area onto which the material is dropped will be completely enclosed with barricades at least 42 inches high and at least 6 feet back from the projected edge of the opening above.
3. All floor openings not used as material drops, will be securely covered and capable of supporting any load which may be imposed.
4. All stairs, passageways, ladders and incidental equipment will be periodically inspected and maintained in a clean, safe condition.
5. Any area where material is dropped outside the exterior walls of the structure will be effectively protected.
6. When floor arches have been removed, planking will be provided according to the standards in 1926.855(b) before workers can begin raising the steel framing.
7. Inspections will be made by a competent person as work progresses to detect hazards from weakened or deteriorated floors, walls or loosened materials.

BLASTING AND EXPLOSIVES

Only authorized and qualified persons will be permitted to handle explosives. No smoking, firearms, matches, open flame lamps and other fires, flames or heat producing devices and sparks will be prohibited in or near explosive magazines and while explosives are being handled, transported, or used.

All explosives will be accounted for at all times. An inventory and use record will be maintained. All explosives not in use will be kept in a locked magazine. Precautions will be taken to prevent accidental discharge of electric blasting caps from current induced by radar, radio transmitters, lightning, adjacent power lines, dust storms and other sources of extraneous electricity. All blasters will meet the specifications set forth in the standard 1926.901.

Every vehicle or conveyance used for transporting explosives will be marked on both sides, front, and rear with placards reading "EXPLOSIVES" of the proper size and color. These vehicles will be attended to at all times.

Explosives and related materials will be stored in approved facilities as required by the Internal Revenue Service Regulations 26 CFR 181, Commerce in Explosives. All blasting caps, electric blasting caps, detonating primers and primed cartridges will be stored in separate magazines from explosives or blasting agents. Tamping will be done only with wood rods or plastic tamping poles without exposed metal parts except for non-sparking metal connections of jointed poles. The "drop fuse" method of dropping or pushing a primer or any explosive with a lighted fuse attached is forbidden. A loud warning signal will be given by the blaster in charge before the blast is fired.

POWER TRANSMISSION AND DISTRIBUTION

1. All electric equipment and lines will be considered energized until determined to be de-energized by test or other appropriate means.
2. Employees will be provided training and will be knowledgeable and proficient in procedures involving emergency situations and first aid fundamentals including resuscitation.
3. Rubber protective equipment will meet the requirements of the American National Standards Institute J6 series.
4. Protective hats will meet the requirements of ANSI 284.2-1971. Industrial Protective Helmets for Electrical Workers, Class B will be provided and worn at the job site.
5. Aerial lift trucks working near energized lines or equipment will be grounded or barricaded and considered as energized equipment or the lift truck will be insulated for the work being performed.
6. Tag lines or other suitable devices will be used to control loads being handled by hoisting equipment where hazards to employees exist.
7. When attaching grounds, the ground end will be attached first and the other end attached and removed using insulated tools or other suitable devices.
8. When working on buried cable or a cable in manholes, metallic sheath continuity will be maintained by bonding across the opening or by equivalent means.
9. The requirements of 1926.959(a) and (b) will be complied with for all lineman body belts, safety straps, and lanyards.

ROLLOVER PROTECTIVE STRUCTURES (ROPS)

All rubber tired, self-propelled scrapers, rubber tired front end loaders, wheel type agricultural and industrial tractors, crawler tractors, crawler type loaders, and motor graders (with or without attachments) will be equipped with rollover protective structures. These vehicles will meet minimum performance criteria detailed in 1926.1001 and 1926.1002.

STAIRWAYS AND LADDERS - SEE THE FACILITIES SAFETY SECTION OF THIS MANUAL UNDER WALKING AND WORKING SURFACES.

WORK ZONE SAFETY

All Public Utilities employees will be trained in work zone safety procedures using the Work Zone Safety for Municipalities, Utilities and Contractors course prepared by the North Carolina Institute for Transportation Research and Education (ITRE). Each employee will be trained to an awareness level and will be able to demonstrate competency. Training will be documented and maintained in the Public Works Office.

All information used in training will follow the Manual on Uniform Traffic Control Devices (MUTCD) Part VI by the U.S. Department of Transportation Federal Highway Administration.

A competent person will inspect the work zones at least twice a day for conformance. Work zones will be set up from a traffic control plan and will be designed to minimize traffic disruptions and will be removed in a timely manner. Flaggers will be properly instructed and signage will be in compliance with regulations.

EVAUATION OF PLAN

An inspection to evaluate the implementation of this plan will be conducted in each department annually. Results will be reported to the Safety Committee and to the Department Directors when an area for improvement is identified.

The Safety Committee will review inspection results for trends and issues and recommend actions to improve if needed.

