

HEAVY EQUIPMENT SAFETY PROGRAM

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Purpose

Heavy equipment, including, but not limited to, excavators, tractors, backhoes, and skid steers, are necessary and common tools used on construction projects. There are numerous opportunities for injuries and property damage that can occur during the operation of this machinery due to their sheer size and power, and operating locations adjacent to easily damaged equipment or installed utilities. Unsafe practices by either the operator of the equipment or those around the equipment can create very dangerous situations. Serious injuries can occur if the equipment strikes a worker or if the equipment is rolled over. This program has been created to minimize the risk of injury to employees or bystanders and to avoid damage to property. These requirements are established under OSHA's 29 CFR 1926.600 Equipment Standard.

Scope

This program applies to the operation of heavy equipment on E Light projects by employees, temporary employees, and subcontractors.

Responsibilities

Safety Department

- Assist with implementing a regulatory compliant heavy equipment program.
- Assist with heavy equipment training.
- Provide consultation and guidance when necessary.
- Review this program at least every 3 years and revise this program as needed.
- Periodically evaluate the usage of heavy equipment on jobsites.
- Investigate related injuries and damage.

Supervisors

- Designate and identify personnel authorized to operate heavy equipment (do not allow unauthorized use of the equipment).
- Ensure authorized operators, and supervisors who directly supervise operators, have received proper training and certification prior to operating equipment. This includes hands-on training, as needed. Review and ensure understanding of this program.
- Assist with and provide hands-on training.
- Ensure all safety and manufacturer regulations and instructions are followed.

- Ensure heavy equipment is maintained in proper working order and repaired when necessary.
- Ensure employees comply with all provisions of this program.
- Ensure employees are provided with and use appropriate personal protective equipment (PPE).
- Take prompt action, including disciplinary action as appropriate, when unsafe conditions or acts are observed.
- Immediately report ALL incidents to the Director of Education and Loss Prevention.
- Investigate (along with the Safety Department) related injuries and damage.
- Contact Risk Management to evaluate any safety concerns, or as specified in this program.

Operators

- Complete lecture training, hands-on training, and in-person evaluation of competence training prior to operating heavy equipment.
- Perform and document heavy equipment pre-use inspections.
- Report all vehicle maintenance issues to their supervisor and remove the equipment from service if necessary.
- Always operate and maintain equipment in a safe manner.
- Adhere to owner's manual and all provisions in this program.
- Consult with supervisor and/or the Safety Department regarding any unusual hazards.
- Immediately report all incidents to supervision.
- Use Stop Work Authority when necessary.

Classifications

Heavy equipment can be classified into the following categories based on the type of operation:

- Excavating equipment
- Lifting equipment
- Loading and hauling equipment

Depending upon their versatility, heavy equipment may be used for multiple purposes. For example, backhoes are normally used for excavating but they can also load the excavated material into trucks.

Excavation Equipment

An excavator is a power-driven machine mostly used in earthmoving operations. Heavy equipment typically used for excavating include the following:

- Backhoes are used for surface or subsurface excavation of solids and sludge. Backhoes are used to dig below the surface, such as trenches, building footings, and foundations. The backhoe is attached to the loader frame with a ridged coupling.
- Excavators are large backhoes. They can be truck mounted, truck carrier mounted, or self-propelled wheel mounted. They are hydraulic powered and consist of three structures: the revolving unit, the travel base, and the attachment.
- Front-end loaders are self-contained units mounted on rubber tires or tracks and are one of the most versatile and capable pieces of equipment used in excavation work as well as loading. The front-end loader can be equipped to operate as a loader, dozer, scraper, clamshell, forklift, backhoe, crane, auger, or sweeper.

Lifting Equipment

Cranes are used for raising, shifting, and lowering loads.

Loading and Hauling Equipment

- Loaders are used to excavate and move soft materials and load/unload trucks.
- Dozers (bulldozers) are used for pushing and pulling loads, typically used in earthwork operations and demolition work.
- Scrapers are used for loading, hauling, dumping, and spreading loose materials.
- Dump trucks are the most common type of hauling equipment due to their versatility.
- Wagons are earth-moving trailers pulled by tractors.

Hazards

Unauthorized or unwise use of heavy equipment can result in personal injury, loss of life, or severe loss to materials needed to complete a project. Hazards related to heavy machinery can be caused by:

- Poor repair or service (may include repair by an unauthorized person).
- Obstructed view while backing.
- Striking people and collision with other equipment.
- Workers caught between equipment and objects.
- Riders falling off equipment or buckets.
- Overturning of equipment.
- Driving at excessive speeds.
- Unexpected electrical shock.
- Failure of lifting mechanisms/operational failures.
- Injuries to operators due to ingress/egress difficulties.
- Runaway machines.

- Overhead obstructions.

Operator Requirements

Only highly skilled operators who have demonstrated adequate knowledge, ability, and skills to safely operate heavy equipment should be authorized for operation. In addition:

- Operators shall review and follow the manufacturer's operating manual. A copy of the manual must be readily available on the equipment.
- Only trained operators shall operate heavy machinery and must be specifically trained on the equipment they will use.
- Operators shall follow safe work practices when operating heavy machinery.
- Operators shall check vehicles at the beginning of each shift to ensure that the parts, equipment, and accessories are in safe operating condition.
- Operators shall repair or replace any defective parts of equipment prior to use, or report defects to their supervisor and place the equipment out of service until maintenance is performed.
- Operators shall NOT operate equipment in reverse with an obstructed rear view unless it has a reverse signal alarm capable of being heard above ambient noise levels, or a signal observer indicates that it is safe to move.
- Use Spotters when view is obstructed or when required by site-policy.
- Operators should not overload heavy equipment and must ensure that loads are balanced and fully contained within the vehicle. Loads should be secured and covered before moving the vehicle.

Heavy Equipment Requirements

- All heavy equipment that qualifies as a vehicle must have:
 - A service brake, an emergency brake, and a parking brake system, working headlights, taillights, and brake lights.
 - An audible warning device (horn)
 - An intact windshield with working windshield wipers
- Vehicles loaded from the top (e.g., dump trucks) must have cab shields or canopies to protect the operator while loading.
- Ensure that vehicles used to transport workers have seats with operable seat belts firmly secured, and adequate for the number of workers to be carried.
- Equipment should have roll-over protection and protection from falling debris hazards, as needed.
- Equipment should not be modified in terms of its capacity or safety features without the manufacturer's written approval.

- Where possible, do not allow debris collection work or other operations involving heavy equipment under overhead lines.
- Heavy equipment will be kept in clean condition, free of excess dirt, oil, and grease.

Overhead lines

Any work performed near overhead power lines shall be energized electrical work if it is performed within the distances listed on the following table.

Approach distances for qualified employees	
VOLTAGE RANGE) (Phase to Phase)	MINIMUM APPROACH DISTANCE
300v and less	2 feet
Over 300V, not over 750V	4 feet
Over 750V, not over 2kV	10 feet
2kV, not over 15kV	15 feet
15kV, not over 37kV	20 feet
37kV, not over 87.5kV	20 feet
87.5kV not over 121kV	25 feet
121kv not over 140kV	30 feet

If any vehicle or mechanical equipment is capable of having parts of its structure elevated within the limited approach boundary of exposed movable conductors of energized overhead lines and is intentionally grounded, employees working on the ground near the point of grounding shall not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades, dielectric overshoe footwear, or insulation shall be taken. (step and touch potential).

Underground Electrical Lines and Equipment

Before excavation of any depth starts, the appropriate owner or authority (utility locate service) will be notified to identify and mark the location of electrical lines or equipment. If it is determined that there is a reasonable possibility for contacting electrical lines or equipment, appropriate safe work practices, and PPE shall be used during the excavation. In all cases, state excavation requirements will be adhered to.

Pedestrians

Occasionally, equipment must be used in locations shared with pedestrians. The operator will always keep a lookout for ALL pedestrians and drive defensively.

Pre-Use Inspection

- Operators should approach equipment, walk fully around it, and look for hazards on or near equipment.

- Inside the cab, remove trash, make sure cab windows are clean, adjust mirrors, check the fire extinguisher (if present), turn on all exterior lights, and make sure seatbelt is ready to use.
- Check lights, tires, suspension and steering system, exterior hoses, and filters. Look for cracks in the metal structure, unguarded moving parts, or other unsafe conditions. Check engine compartment and belts. Make sure fluid levels are correct.
- Check all gauges and warning lights before starting the equipment. Make sure parking brake is set and other manufacturer's engine start-up guidelines are followed. Start engine, check gauges and warning lights again. Check engine sounds.
- Before moving, warn people in the area. Test the equipment's movements and make sure the backup alarms can be heard.

Training

Initial Training

Supervisors must ensure all operators are adequately trained prior to operating heavy equipment. Training shall consist of a combination of formal instruction (e.g., lecture, online training, etc.), practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and practical evaluation of the operator's performance in the workplace. Operator training shall be conducted by persons who have the knowledge, training, and experience to train heavy equipment operators. Formal instruction is the pre-requisite for practical training.

Formal Instruction

Formal instruction includes online training:

- Specific operating instructions, warnings, limitations, and precautions specific to the type of equipment to be utilized by the operator.
- Differences between the heavy equipment and a vehicle.
- Equipment controls and instrumentation, including their location and proper operation.
- Operating the motor/engine.
- Visibility, including limitations when loading/unloading.
- Attachment use and adaptation, operation, and limitations (when applicable).
- Vehicle capacity and stability limitations.
- Completing equipment pre-use inspections.
- Refueling and/or battery changing/charging.
- Specific workplace operation of the heavy equipment, including the following:
 - Handling loads specific to the operation.
 - Operating in narrow spaces and/or around pedestrian traffic.

- Operating on sloped surfaces.
- Ventilation while using heavy equipment.
- Use restrictions based on hazardous locations.

Practical Training

Practical training includes demonstration performed by the trainer and practical exercises performed by the trainee to ensure competence by the operator when utilizing heavy equipment. Practical training should simulate typical work to be conducted with the heavy equipment and may consist of the following:

- Location and purpose of various levers, gauges, etc.
- How to move the heavy equipment in multiple directions, on an incline (if applicable), navigating tight spaces, etc.
- How to pick up, transport, and place loads.
- How to properly refuel or recharge the equipment.
- How/where to properly park and turn off the truck.

Practical Evaluation

An evaluation of each heavy equipment operator's performance shall be conducted after initial training and at least once every three years thereafter. Practical evaluations shall be conducted by Supervisors who have the knowledge, training, and experience to evaluate the competence of heavy equipment operators. Practical evaluation should be conducted utilizing the heavy equipment to be used by the operator.

Practical evaluation should simulate typical work to be conducted with the heavy equipment and may consist of the following:

- Performing pre-use inspections.
- Safe operation of the heavy equipment.
- Handling a load (if applicable).
- Maneuverability.

Refresher Training

Refresher training may be necessary due to certain circumstances as follows:

- The operator is observed operating the vehicle in an unsafe manner.
- The operator is involved in an accident or near-miss incident.
- The operator receives an evaluation revealing unsafe practices.
- There is a change in workplace conditions affecting operation of heavy equipment.
- There is a change in the type of heavy equipment being utilized in the workplace.

Certification/Recertification

Heavy equipment operators shall be certified prior to operating heavy equipment. This certification must be documented and include the following:

- Operator name.
- Date of training.
- Date of evaluation.
- Evaluator name.

Recordkeeping

The training department is responsible for maintaining the following records:

- Training certifications for all heavy equipment operators, including names and dates of training, and the equipment they are certified to operate.
- Pre-use inspection checklists.
- Maintenance records for each piece of heavy equipment.
- Accident reports involving heavy equipment.

Unless otherwise specified in this program, all records must be retained and made available for at least 5 years.