

Heavy Equipment Safety Program

Background

Heavy equipment or **heavy machinery** or **earthmoving equipment** typically refers to large machinery or equipment designed for earthwork operations, or other large agricultural, industrial, or construction related tasks. The operation of heavy equipment poses risks to both people and property. Training is a critical tool for ensuring operators know how to safely operate the machinery they are working with. Although there are many different types of heavy equipment the same basic safety principles apply to all. Operators must be aware of the significant blind spots that are present and be aware of crush hazards. There are significant hazards to those working around or near heavy equipment due to the movement of the machine during operation. Other factors, such as ice, mud, slick work areas, uneven terrain, open holes or trenches, and traffic may increase the risk of an incident.

Training Requirements

The safe operation of the equipment and the safety of personnel and the public in the area or vicinity of, is always the top priority. Cal/OSHA states "The employer shall permit only qualified persons to operate equipment and machinery," (T8CCR1510). OSHA's Code of Federal Regulations Subpart C "General Safety and Health" provisions require operators to be trained under CFR 1926.21(b)(2) and CFR 1926.20(b)(4) requirements. The employer is required to provide training so that operators can recognize and avoid unsafe conditions. Training must be comprehensive enough to ensure that the operator is fully capable of safely handling the equipment in the types of conditions encountered at the work site.

EH&S/Industrial Safety will arrange, approve, or develop Operator Safety Training Programs to ensure all operators receive a standardized level of training that meets or exceeds the Cal/OSHA and OSHA requirements. All UCSB staff, faculty, students, or volunteer operators working on campus or at satellite locations must be trained according to the requirements of this program. The program will include both classroom as well as 'hands on' operation. Classroom training will cover detailed information on applicable regulatory requirements and safe operation, and conclude with a documented knowledge test. Upon successful completion of the classroom training and knowledge test, an on-site operator skills test will follow. This "hands-on" practical will focus on identifying and

correcting unsafe or incorrect operating techniques, and proper pre-operation inspection procedures. Participants will receive practical operator training and practice time prior to the skills proficiency testing. The duration of practical training varies based on equipment type and aptitude of the operator. Upon successful completion of classroom and skills proficiency sections of the course the trainee will be certified to use the equipment. Certifications will expire five (5) years from date of completion.

Department Heads and Chairs Responsibilities

Department Heads and Chairs must:

1. Ensure departmental compliance with the requirements of this program.
2. Identify in writing all responsible persons under their supervision and ensure they have the knowledge and authority to carry out their responsibilities as listed below.
3. Provide the necessary resources to ensure the health and safety of their employees.

Supervisor Responsibilities

Supervisors of individuals who operate Heavy Equipment (Responsible Person) must:

1. Understand and comply with all program requirements.
2. Ensure appropriate equipment for each job task and work-environment is selected.
3. Ensure personnel are properly trained, certified, and authorized to operate , in accordance with this program and applicable regulatory requirements. An operator must be trained on each piece of equipment they will be operating and the training must be documented.
4. Ensure a documented job hazard analysis is available for each piece of equipment and operators have received documented training on its contents.
5. Ensure an operations and maintenance manual is obtained and included with the equipment.

6. Conduct documented pre-use inspections and preventive maintenance of the equipment at the required intervals based on manufacturer's specifications.
7. Ensure equipment is not modified unless approved by the manufacturer.
8. Lock-Out and Tag-Out equipment that has not been properly inspected, maintained, or is otherwise unsafe to operate.
9. Maintain an up-to-date of trained/certified operators for each piece of equipment under their purview.
10. Ensure all required personal protective equipment (PPE) for persons trained and authorized to operate heavy equipment is readily available, in safe and sanitary condition, and is worn when required. This includes: hard hats, safety glasses, high-visibility vests, safety gloves, and safety shoes/boots.
11. Ensure operators and nearby workers adhere to safe-work practices whenever powered industrial equipment is used, including wearing required personal protective equipment (PPE).
12. Approve Contractors / Vendors to use heavy equipment on their premises, and only allow properly licensed contractor / vendor personnel to use Department-owned equipment. **Note:** *Contractors/vendors must have proof of training and certification to operate this equipment equal to or exceeding the established requirements for UCSB personnel.*
13. Notify the EH&S Program Administrator of changes in equipment and ensure that any equipment not previously approved by the EH&S Program Administrator is reviewed and approved prior to acquiring.
14. Notify the EH&S Program Administrator of any unsafe and unauthorized use of equipment under their purview.

Operator Responsibilities

All operators must:

1. Understand and comply with all program requirements.
2. Review and understand the operations and maintenance manual for the equipment operated.

3. Ensure Pre-use Inspections and Equipment Selection and Site Hazard Evaluations are performed and documented by the operator prior to each work shift using the equipment.
4. Notify their Supervisor or EH&S about any mechanical, safety or environmental related concern, or hazardous condition(s) observed.
5. Only use equipment that they are certified and trained to operate.
6. Operate equipment in accordance with instruction and training provided by the EH&S Program Administrator, their Supervisor, the Responsible Person, or a third-party training vendor.
7. Always stow/secure equipment in a safe manner when not in use;
8. Inform their Supervisor or the EH&S Program Administrator if they are on medication or have any other conditions or concerns, that could result in unsafe operation of the equipment;
9. Not disassemble, modify, or otherwise alter equipment in any way unless approved by the manufacturer and performed by a qualified person.
10. Report any observed or suspected malfunctioning of equipment

EH&S Responsibilities

1. Designate an individual who is qualified by appropriate training and/or experience to administer this program.
2. Develop and maintain the UCSB Heavy Equipment Safety Program and ensure it meets applicable regulatory requirements and best practices.
3. Communicating requirements, objectives, and program changes to departments impacted by this program.
4. Develop, maintain, and provide training and other program materials as necessary.
5. Oversee program records and ensure they are retained for the appropriate amount of time.

6. Work with Responsible Persons to identify safe locations where field training may be conducted.
7. Conduct regular program audits to ensure the program is being properly implemented and assess overall program effectiveness.
8. Conduct periodic “customer service” inquiries to learn how the program can be modified to better meet client department needs
9. Keep an accurate and up-to-date inventory of campus AL/EWP based on information provided by Responsible Persons and information gathered during annual inspections.
10. Assist with equipment selection and site hazard evaluations upon request.

Examples of Heavy Equipment (non-exhaustive):

1. Excavators

Excavators are important and widely used equipment in the construction industry. Their general purpose is to perform excavations, but other than that they are also used for many purposes like heavy lifting, demolition, trenching, river dredging, removal of trees etc. Excavators contain a long arm and a cabin. At the end of the long arm a digging bucket is provided and the cabin is the provided location for operating. This whole cabin arrangement can be rotatable up to 360° which eases the operation. Excavators are available in both wheeled and tracked forms of vehicles.



2. Backhoe

Backhoe is another widely used piece of equipment which is suitable for multiple purposes. The name itself is telling that the hoe arrangement is provided on the back side of the vehicle while the loading bucket is provided in the front. This is useful for excavating trenches below the machine level and using the front bucket for loading, unloading, relocating and lifting of materials.



3. Bulldozers

Bulldozers are another type of material moving equipment which are used to remove the topsoil layer up to particular depth. The removal of soil is done by the sharp-edged wide metal plate provided at its front. This plate can be lowered and raised using hydraulic pistons. These are widely used for the removal of weak soil or rock strata, lifting of soil etc.



4. Trenchers

Trenchers or Trenching machines are used to excavate trenches in soil. These trenches are generally used for pipeline laying, cable laying, drainage purposes

etc. Trenching machines are available in two types namely tracked trenchers and wheeled trenchers.



5. Loaders

Loaders are used on construction sites to load material onto dumpers, trucks etc., or relocate material to a desired location. The materials may be excavated soil, demolition waste, rock, sand, raw materials, etc. A loader contains a large sized bucket at its front with a shorter moving arm. Loaders may be either tracked or wheeled. Wheeled loaders are widely used in sites while tracked or crawled loaders are used in sites where wheeled vehicles cannot reach.



6. Compactors

Compactors or Rollers are used to compact the material or earth surface. Different types of compactors are available for different compacting purposes. Smooth wheel rollers are used for compacting shallow layers of soil or asphalt etc. sheep-foot rollers are used for deep compaction purposes. Pneumatic tyred rollers are used for compacting fine grained soils, asphalt layers, etc.



7. Skid Steer Loader

Skid-steer loaders are typically four-wheeled or tracked vehicles with the front and back wheels on each side mechanically linked together to turn at the same speed, and where the left-side drive wheels can be driven independently of the right-side drive wheels. This is accomplished by having two separate and independent transmissions; one for the left side wheels and one for the right side wheels.



8. Dump Trucks

Dump trucks, known also as a dumping truck, dump trailer, dumper trailer, dump lorry or dumper lorry or a dumper for short, is used for transporting materials. A typical dump truck is equipped with an open-box bed, which is hinged at the rear and equipped with hydraulic rams to lift the front, allowing the material in the bed to be deposited ("dumped") on the ground behind the truck at the site of delivery. Operators must follow local regulatory requirements regarding the tarping or covering of the material being transported.



9. Lawn and Garden Tractors, Mules, and other Utility Vehicles (UTVs)

A tractor is any motorized vehicle used to haul or pull heavy loads, although typically used in agricultural operations such as farming, other examples include lawn and garden tractors such as ride-along lawn mowers, mules, or utility vehicles (UTVs). Tractors serve a wide variety of uses and there are many tools, attachments, and ways to customize these vehicles to perform work. **Note:** any vehicle that is solely used to transport passengers or commercial goods is not considered part of this program. Training for passenger vehicles would be under the Defensive Driver program.



Next Review Date: Every five years or earlier if deficiencies are identified or required by regulatory updates.

For more information, please contact the EH&S Industrial Safety Program at ehs-industrialsafety@ucsb.edu.