

Environmental Health and Safety

Skid Steer and Mini Excavator Program

Table of Contents

1.	Summary.....	4
1.1	Objective	4
1.2	Scope	4
2.	Regulations & Other Requirements	4
2.1	Occupational Safety & Health Administration (OSHA).....	4
2.2	University of Virginia (UVA).....	4
3.	Roles and Responsibilities.....	4
3.1	Environmental Health & Safety (EHS).....	4
3.2	Department Managers or Chairs.....	4
3.3	Supervisors (Employee and Course Instructor)	5
3.4	Equipment Operators	5
3.5	Competent Person (Designated Equipment Trainer)	5
4.	Skid Steer and Mini Excavator Program	5
4.1	Operator Training.....	5
4.1.1	Safe Operation.....	5
4.1.2	Training Program implementation.....	5
4.1.3	Training Program Content.....	6
4.1.4	Refresher Training and Evaluation	6
4.1.5	Certification	7
4.2	General Safety Requirements	7
4.2.1	Personal Protective Equipment (PPE)	7
4.2.2	Pre-Start/Walk around inspection:.....	7
4.2.3	General Maintenance:.....	8
4.2.4	Work Site:.....	8
4.2.5	Mounting the Machine:	8
4.2.6	Starting the Machine:.....	8
4.2.7	Machine Operation.....	8
4.2.8	Ether: Cold Start Precautions	9
4.2.9	Refueling.....	9
4.2.10	Shut Down/Parking.....	9
4.3	Principles of Safe Operation	9
4.3.1	Service and Maintenance	10
4.4	Additional Safety Guidelines.....	10
4.5	Available Resources	11
	Appendix A: Definitions.....	12
	Appendix B: Acronyms	13

Intentionally Left Blank

1. Summary

1.1 Objective

This program is intended to address Earthmoving Equipment as defined in 29 CFR§1926.602 Material Handling equipment and 29 CFR§1926.959 Mechanical Equipment to reduce the risk of work-related injury or fatality by maximizing personal safety during heavy equipment operation. There are no generalized OSHA Standards for Heavy Equipment Operators. The University recognizes the hazards associated with the operation of heavy equipment and has developed this program to establish safety procedures and training requirements for faculty, staff, and students. The safety procedures developed in this program are considered supplemental to the Manufacturer's Operator and Safety Manuals.

1.2 Scope

This program applies to heavy equipment that may be propelled by gasoline, propane, diesel, or electricity. Heavy Equipment that is covered by this program only includes: Skid steers and mini excavators. This program establishes requirements to work in or around heavy equipment. Only competent individuals may operate heavy equipment. An individual's competency must be demonstrated by successful completion of the training and evaluation process specified in this program. The program also applies to UVA employees and students who temporarily operate skid steers and mini excavators in an instructional environment.

2. Regulations & Other Requirements

2.1 Occupational Safety & Health Administration (OSHA)

This Skid Steer and Mini Excavator Program complies with Occupational Safety and Health Administration (OSHA) standards 29 CFR 1926.602, *Material Handling Equipment* and 29 CFR 1926.959 *Mechanical Equipment*.

2.2 University of Virginia (UVA)

This Skid Steer and Mini Excavator Program complies with and adheres to applicable OSHA regulations that have been developed and are relevant to the unique working and instructional environments of UVA faculty, staff, and students.

3. Roles and Responsibilities

3.1 Environmental Health & Safety (EHS)

- a) Assist with the development of accident prevention methods, procedures and Skid Steer and Mini Excavator Program.
- b) May conduct inspections of a work or instructional site utilizing heavy equipment.
- c) Investigate safety concerns, accidents, and hazardous conditions, and provide a corrective actions plan.

3.2 Department Managers or Chairs

- a) Identifying the specific jobs or individuals to whom this program applies.
- d) Identifying all heavy equipment in their department.
- e) Ensure that operators of heavy equipment are trained, evaluated, observed, and given skills needed to operate the equipment safely.
- f) Ensuring that safety procedures outlined in this and other UVA programs, as well as in Manufacturer's Operator's and Safety Manuals are implemented and enforced.

3.3 Supervisors

Supervisors have primary responsibility for the prevention of accidents and the safety of operators under their supervision. Supervisor's responsibilities include:

- a) Ensuring that a competent person provides heavy equipment training and evaluations.
- b) Assuring that operator's manuals and manufacturer's safety information are available for all heavy equipment and vehicles identified in the department.
- c) Observing and evaluating the use of heavy equipment by operators and correcting any unsafe conditions or practices and reporting or correcting any found.
- d) Checking and ensuring that heavy equipment is properly maintained and in safe operating condition..
- e) Remove from service any heavy equipment that is not safe.
- f) Promptly notifying EHS of and investigating all accidents, to include completing required reports.
- g) Encouraging individuals to report all unsafe conditions and practices.
- h) Being familiar with and enforcing all safety procedures and practices applicable to work completed with heavy equipment.
- i) Maintaining training and certification records for all equipment operators.

3.4 Equipment Operators

- a) Successful completion of appropriate operator training as required by their supervisor.
- b) Reading, understanding and complying with owner's manuals and manufacturer-provided safety information before using heavy equipment.
- c) Reading, understanding, and following the procedures and practices outlined in this program.
- d) Completing the Skid Steer / Equipment Pre-Use Checklist before use. (Appendix C)
- e) Report any inspection deficiencies with equipment to their immediate supervisor for maintenance or further action prior to operation of the equipment.
- f) Using all appropriate safety equipment and devices, including but not limited to seatbelts.
- g) Immediately reporting all accidents, fuel spills, fires, and injuries to their supervisors.
- h) Obey traffic signs and signals and audible or visual warning devices.
- i) Immediately reporting all unsafe conditions and practices to their supervisors, safety coordinator, and/or Department Head.

3.5 Competent Person (Designated Equipment Trainer)

- a) Train and evaluate equipment operators in classroom, hands-on training process and refreshers.
- b) Be knowledgeable and experienced in the particular equipment operation and how to train. Seek appropriate training and/or knowledge to be the "Equipment Trainer."
- c) Document evaluations and training.

4. Skid Steer and Mini Excavator Program

4.1 Operator Training

4.1.1 Safe Operation

An employer must ensure that each equipment operator is competent to operate the equipment safely, as demonstrated by the successful completion of the training and evaluation specified in this section.

Prior to permitting an individual to operate equipment (except for training purposes), a supervisor must ensure that each operator has successfully completed training required by this section.

4.1.2 Training Program implementation

Trainees may operate equipment only:

- Under the direct supervision of persons who have the knowledge, training, and experience to train operators and evaluate their competence.

- Where such operation does not endanger the trainee or other bystanders.

Training will consist of a combination of formal instruction, practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance.

4.1.3 Training Program Content

Equipment Operators must receive initial training in the following topics, except those topics that the employer can demonstrate are not applicable to safe operation of equipment in the workplace or course curriculum. Training will be documented. The trainer and supervisor will maintain all training documentation.

Equipment-Related Topics

- Operating Instructions, warnings, and precautions for the types of equipment the operator will be authorized to operate.
- Operator will read and understand Owners/Operators Manual and any other safety information provided by the manufacturer of the equipment.
- Trainer will review this information with the trainee and should incorporate additional information about specific equipment based on previous experiences with the equipment.
- Differences between the equipment and an automobile (e.g., tum radius, braking ability, visibility of surroundings, blind spots, etc.)
- Equipment controls and Instrumentation; where they are located, what they do, and how they work.
- Engine or motor operation.
- Steering and maneuvering.
- Visibility (including restrictions due to loading).
- Implement and attachment adaptation, operation, and use limitations.
- Equipment capacity.
- Vehicle stability.
- Any equipment inspections the operator will be required to perform. Skid Steer / Equipment Pre-Use Checklist (See *Appendix C*)
- Refueling
- Fuel Handling Safety Procedures.
- Operating limitations.
- Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of equipment that the employee is being trained to operate.
- Workplace-Related Topics
 - Surface conditions where the equipment will be operated.
 - Composition of loads to be canted and load stability.
 - Load maneuvering, loading, and unloading.
 - Pedestrian traffic in areas where the equipment will be operated.
 - Ramps and other sloped surfaces that could affect the vehicle's stability.
 - Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation.

4.1.4 Refresher Training and Evaluation

Refresher training, including an evaluation of the effectiveness of that training, must be conducted as required below to ensure that the operator has the knowledge and skills needed to operate the heavy equipment.

Refresher training in relevant topics will be provided to the operator when:

- The operator has been observed to operate the equipment in an unsafe manner.
- The operator has been Involved In an accident or near-miss incident.
- The operator has received an evaluation that reveals that they are not operating the equipment safely.
- The operator is assigned a different type of equipment to operate.
- A condition on the job changes in a manner that could affect safe operation of the equipment.

4.1.5 Certification

The trainer will certify that each operator has been trained and evaluated as required by this section. The certification will include the name of the operator, the date of the training, the date of the evaluation, and the identity of the person(s) performing the training or evaluation. Refresher training of the operator, and at a minimum frequency of every three years.

UVA students that are trained and evaluated will not get a certificate upon completion. Students operating a skid steer or mini excavator as part of curriculum are considered temporary operators and are allowed to operate the machinery only within the scope of the course project.

4.2 General Safety Requirements

Only trained and authorized operators shall be permitted to operate the designated equipment.

4.2.1 Personal Protective Equipment (PPE)

PPE is mandatory and may include the following:

- Boots or Safety Shoes
- Long Pants
- Hearing Protection
- Eye/Face Protection
- Hard Hat
- Gloves
- Safety Vest

4.2.2 Pre-Start/Walk around inspection:

All equipment must have a pre-inspection completed at the beginning of each shift, or class, to assure that the following parts, equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use:

- Horn
- Parking System (hand brake)
- Emergency Stopping System (Brakes)
- Operating Controls
- Service Brakes (including any trailer brake connections)
- Steering Mechanism
- Seat Belts
- Safety Devices
- Tires
- All known defects will be corrected before the vehicle is placed in service.

These requirements also apply to equipment such as lights, reflectors, windshield wipers, defrosters, fire extinguishers, etc., where such equipment is necessary.

Operators will complete the Skid Steer / Equipment Daily Inspection Checklist (*Appendix C*) every day that a piece of equipment is used, prior to using the equipment.

- Check for loose or worn parts and repair or replace immediately.
- Check all fluid/coolant levels.
Caution: Open the radiator cap only when the engine is cooled.
- Inspect hydraulic line connectors and hoses for leaks before applying pressure to the system. Use paper or cardboard, not your hands, to search for leaks.
Caution: Hydraulic fluid can be under pressure and can penetrate skin and cause serious bodily harm.
- Ensure fire extinguisher and first aid kit are in cab
- Check tires for cuts, bulges, irregularities, abnormal wear and proper inflation.

4.2.3 General Maintenance:

- Ensure the cab area is clean and free of debris and tools.
- Clean windshield, mirrors, and lights.
- Remove all oil, grease, or mud from grab Irons, handrails, steps, pedals, and floor to prevent slips and falls.
- Remove or secure any loose items from the cab.
- For UVA-owned equipment, certain maintenance or servicing may be required and performed by authorized individuals. For example, when servicing equipment, fasten a “Do Not Operate” tag on the steering wheel. Review Lock Out/Tag Out Procedures prior to servicing any equipment.

4.2.4 Work Site:

- Call 811 prior to any work being completed to check and mark the area for underground cables, gas lines, and water mains.
- Know work area clearances - watch for overhead or underground objects, holes, drop-offs, and partially hidden obstacles and wires.

4.2.5 Mounting the Machine:

DO NOT GET ON OR OFF A MACHINE THAT IS IN MOTION

- Maintain a 3-point contact with the steps and handrails while getting on/into the machine.
- Do not use the controls or steering wheel as a handhold.

4.2.6 Starting the Machine:

EXHAUST FUMES ARE DANGEROUS. ALWAYS OPERATE THE MACHINE IN A WELL-VENTILATED AREA.

- Fasten your seat belt and adjust the seat prior to starting.
- Controls should be in neutral and the parking brake set before starting engine.
- Start the engine only from the operator's seat.
- Warn individuals in the area that you are starting the engine.
- Check all gauges, lights, instruments, and warning devices to assure that they are functioning properly, and the readings are within normal range.
- Test steering right and left.
- Test brakes for function before getting up to speed
- Ensure all controls are operating properly.

4.2.7 Machine Operation

- *Always use the seat belt.* Most heavy equipment is required to have a seat belt and rollover protection (ROPS). OSHA takes the position that seat belts are personal protective equipment and failure to use them is grounds for a citation.
- Operate. Navigate. Communicate. Always maintain control of the machine first, concentrate on where you want to go second, and communicate third. No one can stop a machine from rolling but you.
- Acquaint yourself with the controls before operating the machine.
- No passengers. Ever.
- While backing up use extra care and sound the horn to clear the area. Ensure the backup alarm is functioning.
- Drive at speeds compatible with working conditions.
- **DO NOT** coast downhill. Select a gear that will prevent excessive speed when going downhill. Do not park on a steep incline.
- Know the stopping distance at any given working speed.
- **DO NOT** permit anyone to stand or pass under the bucket or lift arms.
- Follow the manufacturer's load capacity limits. Identification plates are attached to all machines.

- If the machine is tipped, rolled, or otherwise stuck, attempt to back it out of the unstable condition or stop engine and call for help. **DO NOT EXIT THE MACHINE IF THE MACHINE IS NOT ON STABLE GROUND WITH THE BOOM DOWN UNLESS IT IS ON FIRE.** The safest place to be is in the machine, with a seatbelt on, with the lap bar down.
- **DO NOT** make mechanical adjustments while the unit is in motion.
- Always follow the manufacturer's recommendations for pulling or towing.
- Lower all the hydraulic equipment before shutting down or getting off the machine.

4.2.8 Ether: Cold Start Precautions

- Diesel cold start systems contain ether, which is explosive. Keep away from heat, sparks, and open flames. Work in a well-ventilated area.
- Point the openings of the valve, tube, or atomizer away from yourself and others while testing the diesel cold start system.
- Store replacement ether cylinders in a cold dry place away from direct sunlight, do not keep them in the operator's compartment.
- Secure all tools and materials to prevent movement when transported in the same compartment with operator.

4.2.9 Refueling

- Shut off and cool the engine and any electrical equipment before fueling.
- Ensure the fueling area is well ventilated.
- Keep open flames and sparks away from area.
- Ground the funnel or fuel nozzle against the filler neck to avoid sparks when refueling.
- Check the battery and electrolyte fluid according to manufacturer's instructions.
- Know where the fire extinguishers are located.

4.2.10 Shut Down/Parking

- Park on level ground.
- When parking on a grade, block the wheels and set the parking brakes.
- When parking, lower all loaders, buckets, and hydraulics to the ground.

4.3 Principles of Safe Operation

It is the expectation of UVA that anyone who operates heavy equipment will do so in a manner that is safe. The following are considered leading indicators of safe operation:

- Appropriate training that leads to certification, licensing, and authorization.
- Using pre-use checklists, setting minimal operational standards, and operators' commitment to using fully functional equipment.
- Knowing, understanding and following all applicable standards as well as manufacturer's recommendations on every piece of equipment in operation.
- Supervisors' ability to enforce safe work practices.

Any operation inconsistent with these references is unsafe and subject to disciplinary action. The following are the rules of the road:

- Stunt driving and horseplay are strictly forbidden.
- All operators must obey any posted speed limits signs, postings, audible, and visual warning devices under all travel conditions.
- Wear appropriate PPE for equipment and task being performed (i.e., safety vest for visibility, etc.)
- Operators are responsible to keep equipment under control at all times and shall slow down for conditions of wet or slippery ground/ floors, limited work access, high traffic areas of vehicles, and pedestrians and weather factors. Keep speeds low on rough terrain. Bouncing, bucking, or aide hopping because of excessive speed may cause loss of control of the machine.
- Eating, drinking, texting, and talking on a phone are prohibited while operating any mobile equipment.

- f) Operator shall not walk under or allow anyone to work under an elevated or suspended load.
- g) Operators shall keep all body parts inside the vehicle while travelling and wear seatbelts when installed on equipment.
- h) Riders are not permitted.
- i) All equipment rated capacities shall not be exceeded
- j) There must be adequate overhead clearance maintained from lights, sprinklers, pipes, or any other overhead obstructions.
- k) Operators should stay at least 10 feet away from energized or live overhead power lines and maintain safe distances from any other energy sources.
- l) Equipment operators should avoid sudden movements of any control levers; always maintain smooth control of the equipment.
- m) Equipment operators must have knowledge of controls and emergency procedures for manual lowering of any lift in case of power failure.
- n) Never drive up to anyone standing in front of a fixed object.
- o) Equipment operators shall maintain safe distances from edges, such as excavations, elevated ramps, platforms, and people.
Use extreme caution when approaching or operating near excavations, the weight of the machine or vibration may cause the edges to collapse.
- p) When leaving free moving equipment unattended (greater than 25 feet), the equipment operator shall place the bucket basket/attachment on the ground; put the equipment in neutral; set the brakes; shut-off the equipment, remove the key; and block the wheels if on a ramp.
- q) While negotiating turns, ramps, inclines or change in grades, slow down. Heavy equipment is just that. Heavy. It does not maneuver like a car, stops slower, and tips easier at speed.
- r) Do not reach through the door, mast, or over railing to operate the equipment from the floor or ground.
- s) A spotter for heavy equipment is always required during operation of heavy equipment. This is essential as heavy equipment has significant blind spots. The spotter's role is to have constant communication with the operator to prevent injury or death, damage to property or equipment, collisions, or other potentially unseen hazards to the operator or others.

4.3.1 Service and Maintenance

If at any time, heavy equipment is found to need repair, defective, or in any way unsafe, the machine will be taken out of service until it has been restored to safe operating condition.

- Do not fuel with the engine running
- Spillage of oil or fuel must be carefully wiped or completely evaporated, and the fuel tank cap replaced before restarting engine.
- Don't operate equipment with fuel leaks.
- Do not attempt to repair or modify the equipment unless authorized by the rental company.

4.4 Additional Safety Guidelines

Many injuries involving heavy equipment do not occur to the operator but are inflicted on ground personnel working in or around the vicinity of moving machines. Always be aware of the location of personnel working near your machine. Heavy equipment operators frequently require the aid of spotters who should be thoroughly familiar with the procedures of your operation and the capabilities of the machine. Usual operating procedures should not be changed without first notifying spotters. Never assume that people will watch out for themselves. They usually will not. Always know the location of people around you. If they are not visible, **DO NOT MOVE THE MACHINE OR ANY IMPLEMENTS UNLESS WORKING WITH YOUR SPOTTER!** When working in conjunction with a spotter, never operate equipment at speeds that would necessitate your spotter to have to escape.

REMEMBER, your spotter depends on the skill and judgment of a trained operator, as do all people in the immediate work area.

- Read the operator's manual and operate the equipment only if trained and authorized to do so.
- Do a walk around to make sure the area is clear before moving the machine.
- Start machine only while sitting in the operator's seat and all personnel are clear.
- Ensure all controls are in the neutral position before starting the machine.
- Check for overhead lines or obstructions before raising any overhead implement.

- DO NOT walk, work, or allow personnel under any raised part of heavy equipment.
- DO NOT undercut a bank that is higher than the machine.
- Use extreme caution when approaching or operating near excavations, the weight of the machine or vibration may cause the edges to collapse.
- Pre-wet soil to make loading easier and to aid in dust control.
- DO NOT use heavy equipment as a battering ram.
- In tight turns, make sure the machine has clearance in front and rear if equipped with rear implements.
- DO NOT place any part of your body under any raised implement at any time unless it is properly blocked.
- All underground utilities in the work area must be located prior to digging.
- Utility companies must be notified of your intention to excavate within established, or customary, response times. When excavations approach the estimated location of underground utilities, the exact location must be determined and marked.
- NEVER use an elevating part of heavy equipment as a man-lift.

4.5 Available Resources

[OSHA 1926.602 Material Handling Equipment](#)

[OSHA 1926.959 Mechanical Equipment](#)

[Skid Steer Loader Safety for the Landscaping and Horticultural Services \(OSHA\)](#)

Appendix A: Definitions

Attachments: The use of specialized removable equipment that may be required to perform a specialized function or any task approved by the manufacturer of the particular equipment.

Authorization: Authorized (in reference to an employee's assignment). Selected by the employer for that purpose.

Certification: documented proof of the successful completion of a course of training.

Competent Person: a person with the knowledge, training, and experience to recognize hazardous conditions to workers and who has authorization to take prompt corrective measures to eliminate them.

Instructional Environment: Shops, studios, makerspaces, fabrication shops, laboratories, classrooms, or other areas where education, hands-on instruction, training, research, or student-supported activities are conducted, in both on- and off-grounds locations.

Occupational Safety and Health Administration (OSHA): federal agency within the U.S. Department of Labor responsible for establishing and enforcing standards regarding the exposure of worker to safety hazards or harmful materials that they may encounter in the work environment, as well as other matters that may affect the safety and health of workers. (Regulatory)

Mini Excavator: are any excavators that weigh less than seven metric tons. These small excavators are sometimes called compact excavators and are perfect for tight job sites. Mini excavators can maneuver in small spaces for landscaping tasks such as digging holes for trees or trenches for pipe

Skid steer: a self-propelled machine with a shovel or bucket at the end of fixed hydraulic cylinders, used to raise earth or other material.

ROPS (Roll Over Protective Structure): a structure which covers the machine operator in a manner that will minimize the possibility of injury from falling objects or equipment roll over.

Temporary operator: An individual, usually a student, that is only approved to utilize equipment within the scope of a curriculum-based project.

Appendix B: Acronyms

EHS	Environmental Health and Safety
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
ROPS	Rollover Protective Structure
UVA	University of Virginia

Appendix C: Daily Inspection Checklist

Skid Steer / Equipment Daily Inspection Checklist

Name: _____ Date: _____

Hour Meter Reading: _____ Manufacturer: _____

Model Number: _____ Serial Number: _____

Inspection Item	Shift			Describe items needing attention
	OKAY	NOT OKAY	NA	
Structural Damage – none apparent				
Tires / Tracks – condition acceptable				
Glass / Mirrors – clean/clear; unobstructed				
Hydraulic Hoses – good condition/no leaks				
Lubrication – adequate amount				
Fluid Levels – adequate amounts/no leaks				
Engine Oil - level/appearance good				
Cooling Water – adequate amount/no leaks				
Operating Manual - available				
Fire Extinguisher – present, charged, dated				
Seat Belts – functional/latch properly				
Operating Controls - functional				
Horn / Gauges - functional				
Lights and Reflectors – clean/functional				
Steering Mechanism - functional				
Brakes - functional				
Backup Alarm - functional				
Kill Switch (if available) - functional				

If defects are found during the inspection, the equipment should be taken out of service (DO NOT USE) and your supervisor should be notified!

Remarks and additional explanation or suggestions _____

Copy of completed checklist should be kept with equipment and on file with department.

Operator's Signature _____