**Standards of Practice**

**Heavy Equipment Operation**

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| **Document Authority:** | OH&S Director | **Document Custodian:** | OH&S Director |
| **Effective Date:** | 6/30/22 | **Issuing Dept.:** | College of Agriculture EH&S |
| **Next Review Date:** | 6/30/22 | **Responsible Party:** |  Individuals Using Heavy equipment |
| **Document Number:**  | **HE001** |

**I. PURPOSE**

The standard of practice of this organization supplements the KSU Industrial and Mobile Vehicle Policy: <https://www.k-state.edu/policies/ppm/3700/3720.html#utilitymobile> to permit only trained and authorized personnel to operate heavy equipment. This standard of practice applies to both daily operators and those who occasionally use heavy equipment.

**II. DEFINITIONS**

**Heavy equipment** or **heavy machinery** refers to [heavy-duty vehicles](https://en.wikipedia.org/wiki/Heavy-duty_vehicle), specially designed for executing [construction](https://en.wikipedia.org/wiki/Construction) tasks, most frequently ones involving [earthwork operations](https://en.wikipedia.org/wiki/Earthworks_%28engineering%29) or other large construction tasks. *Heavy equipment* usually comprises five equipment systems: implementation, [traction](https://en.wikipedia.org/wiki/Traction_%28engineering%29), structure, [power train](https://en.wikipedia.org/wiki/Power_train), control and information.[[1]](https://en.wikipedia.org/wiki/Heavy_equipment#cite_note-bare_url-1) **(Appendix A)**. *Wikipedia*

**III. SCOPE**

This procedure covers heavy equipment operations that KSU’s College of Agriculture can control and over which it can be expected to have an influence. These activities include, but are not limited to training, inspections, and the safe operation of the equipment.

**IV. CONSEQUENCES OF DEVIATION**

This procedure serves as an essential element in identifying and managing risk to staff associated with heavy equipment activities. Ignoring this procedure could result in serious injuries, fatalities, or property damage.

**V. RESPONSIBILITIES**

The supervisor has overall responsibility for the department and is responsible for the heavy safety program and to assure that the required records are kept on file. Supervisors may delegate any part of the training program to the Operations Trainer(s) to include educational instruction, inspection/maintenance procedures, heavy equipment performance evaluations, and recordkeeping. To assist supervisors the College of Agriculture EHS Office created a Heavy Equipment Operator Certification eLearning course to aid trainers in their understanding the program components and resources involving heavy equipment operator certification: <https://rise.articulate.com/share/NbCuYI2Vak29ELQzdeTnp_uS9TOQc4kv#/>. *To access the course contact your department EHS Coordinator or the COA EHS Office for the username and password.*

The Department Operations Trainer or Departmental Authority is responsible to ensure employee completion of on-line training specific Equipment Operator Safety Course at 360training.com, review the manufacturer operational instructions and inspection/maintenance procedures, and conduct performance evaluations using **(Appendix B)** prior to heavy equipment operation. After successful course completion, the trainer will keep a copy of all records on file.

**VI. PRE-OPERATIONAL PROCEDURES**

The KSU College of Agriculture requires operators to perform pre-operational equipment checks on heavy equipment before it will be utilized. Operators are to complete the Pre-Operational Inspection Heavy Equipment Checklist **(Appendix B)** or manufacturer checklist.

No blank spaces are allowed on the form. If an item does not apply, use the code NIA. Fill out the comment section accurately to reflect any operational or visual defects so that appropriate repairs can be completed before the heavy equipment becomes unsafe to operate. Describe the problem thoroughly so that the repair personnel can pinpoint the trouble immediately **(Appendix C).**

If a completed checklist form is not present on the heavy equipment, then the heavy equipment may not be operated until a checklist is completed.

If the heavy equipment is safe to operate:

1. Place the completed checklist form on the holder provided on the vehicle. The checklist must remain on the vehicle's holder for the duration of the shift. This serves as a visual notice to all area operators that this piece of equipment was inspected and may be used during the shift without another inspection.
2. At the end of the shift, the checklist should be turned in to the department manager/supervisor. The manager/supervisor is responsible for reviewing the checklists for accuracy, completeness, and any noted defects.

If the heavy equipment is unsafe to operate:

1. Note that on the checklist.
2. Remove the key from the heavy equipment and place a DANGER DO NOT OPERATE tag on the steering wheel or control lever of the heavy equipment.
3. The employee should take the completed checklist to the manager/supervisor and inform them of the problem. The manager/supervisor will complete a work order form and schedule the heavy equipment for repair.
4. It is against company policy to operate a defective heavy equipment or one that has a DANGER DO NOT OPERATE tag placed on the steering wheel or control levers. Appropriate disciplinary action will be enforced.

Department manager/supervisor should retain all Pre-Operational Inspection Checklist forms for each vehicle for six months. The file should be updated each month with the previous month's checklists thrown away so that the company always has a constant six-month record retention on these forms should an inspection occur.

**VIII. Standard OPERATING PROCEDURE (General) (Read Equipment Operations Manual)**

1. **Personal protective equipment**

Hardhat and high-visibility clothing to be worn when not inside the cab.

Safety boots in good condition, properly laced, must be worn at all times. Worn-out soles and heels could lead to slips and falls.

Eye protection will be worn where there is danger of falling or flying debris from equipment or loads, especially in windy conditions.

Hand protection will be worn when handling cable or any other material where there is danger of cuts or puncture injury.

Hearing protection will be worn when exposed to noise levels exceeding 85dBA.

1. **Mounting and dismounting** – three-point contact will be used to mount and dismount equipment.
2. **Inspection and repairs** – machine or equipment will be inspected prior to use to ensure good mechanical condition. Special attention will be given to implements and their components.

When working around equipment for inspections or repairs, the equipment must be locked and tagged out, and immobilized and secured against inadvertent movement.

1. **Housekeeping** – cabs, steps, windshields, windows and mirrors must be kept clean at all times. All debris should be removed from around the equipment.
2. **Parking** – the machine or equipment must be parked on level ground, clear of hazards, to allow ease of access.
3. **Traveling** – operators must ensure that all connections to a towing vehicle are secured and attached properly.

Place all implements in the travel position.

Select a speed appropriate to ground conditions while maintaining control of machine.

Travelling on hills should be conducted in the direction of the slope, avoiding side hill travel.

Approach landing or roadway with caution taking into consideration limited visibility and blind spots.

Equipment should be cleaned prior to traveling roadways or being floated anywhere.

Keep right while traveling in route to and from work site, while maintaining radio communication.

1. **Danger zone** – danger zone is defined as the area around operating machines or working personnel, in which there is potential for being struck by moving equipment or objects. The danger zone may vary according to the machine or work being performed. Operators must make sure that all persons, vehicles and equipment are clear of the danger zone before the vehicle or its components are moved.
2. **Lockout** – lockout procedures must be followed during mechanical service, repairs or inspection for the protection of employees and equipment.

Refer to company and manufacturer’s procedures on lockout.

Communications while assisting in mechanical repairs – When operators are assisting mechanics to repair machines, clear communications must be established prior to starting the tasks. The operator and the mechanic must each know who will be responsible for:

a) Starting or moving a machine

b) Ensuring that anyone involved is in a clear and safe position

c) Directing the movement of the machine

d) Ensuring that it is safe to resume working and that all guards are in place.

The operator must have a clear understanding of what is to be done and follow the specific lockout instructions and instructions given by the mechanic responsible for performing the job.

1. **Fueling**– shut off the engine of the towing vehicle while it’s being fueled. No smoking. Be aware of slip and trip hazards.

Beware of spills and splash-back. Return hose to its proper storage position when fueling completed.

1. **Hazardous materials** – read WHMIS label. If there is no label, contact the supervisor. Refer to MSDS if further information is needed.

Use protective equipment and follow safe handling instructions as outlined on WHMIS label.

If an incident occurs, follow first aid instructions.

Use proper storage procedures.

1. **Operating equipment**

Prior to starting heavy equipment, the operator shall ensure that all personnel are out of the danger zone and the transmission is in neutral.

Maintain a safe operating distance between neighboring equipment.

Understand the load limitation of the machine according to ground conditions and tree species. Apply the manufacturer’s standards for machine capacity and limitations. The operator should always know the maximum lifting capacity of the equipment before lifting a load.

Maintain communications between equipment.

Seat belts, if available, must be worn.

No unauthorized personnel will be allowed on the machine during operation.

In the event of leak of fuel or oil, switch the machine off immediately.

If warning lights show or gauges register outside normal limits, switch off engine.

Never lift, move or swing any attachments or load over any person or other equipment/vehicles.

Be aware of overhead clearance. Watch for overhead power lines.

**VIII. TRAINING**

Under no circumstances should an employee operate a heavy equipment until he/she has successfully completed the heavy equipment operation safety training program. This includes all new operators regardless of claimed previous experience.

The training program includes on-line training Heavy Equipment Operator Safety Course at 360training.com, review the manufacturer operational instructions and inspection/maintenance procedures, and conduct performance evaluations using **(Appendix B)** prior to heavy equipment operation.

The departmental manager/supervisor will identify all new employees that will need to be trained as heavy equipment operators and make arrangements for those employees identified to complete the necessary training.

Course training consists of:

1. Review of equipment manufacturer operations manual by the employee.
2. Completion of interactive 360.com computer-based training on the specific heavy equipment Operator Safety Course and successful completion of the examination.

The computer-based training program covers equipment introduction, stability, maintenance, inspections, hazards, safe operation, attachment and more.

1. Review of Heavy Equipment Standard of Practice and KSU Industrial and Mobile Vehicle PPM by the employee.

Operational training consists of:

1. Pre-Operational Inspection or manufacturer checklist procedures. **(Appendix B)**
2. Operational review of the heavy, the employee is expected to operate. This includes:
	* Pre-operational checklist procedures;
	* Proper use of controls;
	* Maneuvering skills;
	* Selecting and picking uploads,
	* Driving with a load;
	* Moving loads; and
	* Re-fueling/charging operations.
3. Completion of the Heavy Equipment Operator Evaluation. **(Appendix B)**

**IX. RELATED DOCUMENTS & TOOLS**

* OSHA Standard 29CFR 1926.600
* KSU Industrial and Mobile Utility Vehicle PPM
* Workplace Safety North

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| **Revision** |
| **REVISION DATE**  | **REVISION NO.**  | **REVISION AUTHORITY**  | **NATURE OF REVISION**  |
|  |  | EH&S Coordinator | Date of Original Document Issuance |
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**Controlled documents are maintained electronically.
Printed documents are UNCONTROLLED.
Prior to relying on a printed document, verify that it is current.**

 **(Appendix A)**

 **Examples of Heavy Equipment**

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**Heavy Equipment Operator Evaluation Forms and Pre-Use Inspection Checklists**

 **(Appendix B)**

Instructions: Use the checklists to evaluate operator proficiency. It can also be used for period evaluation to ensure that operators are continuing to operate a heavy equipment properly. It is the supervisor’s responsibility to notify the College of Agriculture EHS Office if the equipment they are operating is not listed below and they are in need of an operator performance audit and pre-use inspection.

**Heavy Equipment** (Performance Evaluation Guides and Pre-Use Inspection Checklists to use as templates to adapt to your specific equipment if not provided by the equipment manufacturer)

* KSU Heavy Equipment Policy
* [Backhoe: Evaluation Guide](https://www.ksre.k-state.edu/agsafe/manuals_forms/backhoeevalguide.pdf%202.pdf)
* [Backhoe: Pre-Use Checklist](https://www.ksre.k-state.edu/agsafe/manuals_forms/backhoemaintchklst.pdf%202.pdf)
* [Heavy equipment Evaluation and Pre-Use Checklist](https://www.ksre.k-state.edu/agsafe/manuals_forms/index.html)
* [Dump Truck: Evaluation Guide](https://www.ksre.k-state.edu/agsafe/manuals_forms/heavydumptrkevalguide.pdf%202.pdf)
* [Dump Truck: Pre-Use Checklist](https://www.ksre.k-state.edu/agsafe/manuals_forms/heavydumptrkmaintchklst.pdf%202.pdf)
* [Front Loader: Evaluation Guide](https://www.ksre.k-state.edu/agsafe/manuals_forms/frontendloadrevalguide.pdf%202.pdf)
* [Front Loader: Pre-Use Checklist](https://www.ksre.k-state.edu/agsafe/manuals_forms/frontendloadrmaintchklst.pdf%202.pdf)
* [Grader: Evaluation Guide](https://www.ksre.k-state.edu/agsafe/manuals_forms/graderevalguide.pdf%202.pdf)
* [Grader: Pre-Use Checklist](https://www.ksre.k-state.edu/agsafe/manuals_forms/gradermaintchklst.pdf%202.pdf)
* [Hydraulic Excavator: Evaluation Guide](https://www.ksre.k-state.edu/agsafe/manuals_forms/hydraulicexcavatevalguide.pdf%202.pdf)
* [Hydraulic Excavator: Pre-Use Checklist Upper Structure](https://www.ksre.k-state.edu/agsafe/manuals_forms/hydexcav_upprstrucchklst.pdf%202.pdf)
* [Hydraulic Excavator: Pre-Use Checklist Carrier](https://www.ksre.k-state.edu/agsafe/manuals_forms/hydexcav_carrierchklst.pdf%202.pdf)
* [Trackhoe: Evaluation Guide](https://www.ksre.k-state.edu/agsafe/manuals_forms/trackhoeevalguide.pdf%202.pdf)
* [Trackhoe: Pre-Use Checklist](https://www.ksre.k-state.edu/agsafe/manuals_forms/trackhoemaintchklst.pdf%202.pdf)

**(Appendix C)**

**Heavy Equipment Inspection & Maintenance Record**

If you have any questions about the use of the inspection and maintenance record, please contact your supervisor.

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| Department |  |
| Manufacturer |  |
| Model # |  |
| Serial # |  |

**Repair and Maintenance Record**

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| **Date** | **Description of Work** | **Maintenance Performed By** |
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