1. Purpose

University of Alaska Anchorage (UAA) employees, student workers, faculty, staff, and outside contractors who operate or work near heavy equipment in the course of their work functions, are exposed to hazards which could result in serious injury. The hazards associated with heavy equipment operation can be substantially reduced by operating the equipment properly and taking precautions. This program for Heavy Equipment Operation Safety is intended to ensure workers are knowledgeable in the hazards when operating or working in proximity to heavy equipment and the steps to be taken to protect themselves and others.

2. Objective

UAA, in its continuing effort to provide employees with safe, healthful working conditions, and to comply with the Occupational Safety and Health Act is implementing the following program for heavy equipment safety to protect people working at the University, by helping employees, student workers, faculty, staff, and outside contractors better understand hazards while operating or working near heavy equipment.

3. Scope

This program applies to UAA employees, student employees, faculty, staff, and outside contractors who operate or work near heavy equipment.

4. Definitions

**Compact Equipment** - A category of heavy equipment which includes smaller units designed to work on small commercial and residential sites including skid-steer loaders, loader backhoes, mini-excavators, compact track loaders and compact wheel loaders

**Competent Person** - Person who by possession of a recognized degree in an applicable field or a certificate of professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated the ability to operate, inspect or maintain heavy equipment

**Free Moving Mobile Equipment** - Operator controlled mobile equipment not constrained by Fixed Rails and can include Industrial Fork Trucks, Aerial Lifts, Buggies, Sweepers and Backhoes

**Heavy Equipment** - Heavy-duty vehicles, specially designed for executing construction tasks, most frequently ones involving earthwork operations including; earthmoving equipment: scrapers, loaders, crawler or wheel tractors, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, compact equipment, and other similar equipment

**Mobile Equipment** – Free moving equipment propelled/powered by gasoline, propane, natural
gas, diesel or electricity used to haul, transport, excavate, move, maneuver, or hoist materials, equipment, products or personnel

**Personal Protective Equipment (PPE)** - protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury

**Pre-use Inspection** - Required inspection of a piece of mobile equipment completed when the facility has not operated the mobile equipment for each shift.

**Roll Over Protective Structures (ROPS)** - system or structure intended to protect equipment operators and motorists from injuries caused by vehicle overturns or rollovers

### 5. Authority and Responsibilities

In addition to the roles and responsibilities outlined in the UAA Training Program, the following apply to the Heavy Equipment Operation Safety Program.

**EHS/RM**

- Assist departments to determine proper heavy equipment selection and safe-work practices unique to each department’s work activities
- Upon request assist with the implementation of inspections and maintenance on heavy equipment where applicable with this standard
- Assist with the approval of pre-use safety inspection process

**Supervisor**

- Identify personnel who will operate heavy equipment and ensure training is provided prior to operation
- Ensure heavy equipment is properly operated and maintained per manufactures recommendations
- Ensure defective, damaged, or prohibited equipment is removed from service until repairs can be made
- Conduct periodic inspections of heavy equipment operations in their department to ensure integrity
- Assist in the determination of safe work plans and procedures on tasks and projects involving heavy equipment
- Maintain all equipment maintenance and inspection records in the department and have them available upon request
- Ensure appropriate PPE is available for heavy equipment operations
Department Safety Coordinator

- Assist in the determination of safe work plans and procedures involving heavy equipment use
- Conduct periodic inspections of heavy equipment operations in their department to ensure integrity

Employees/Student Workers

- Visually inspect heavy equipment prior to every use for visual signs of wear and damage
- Alert department supervisor when heavy equipment requires repairs or maintenance
- Assess work to identify and mitigate hazards prior to heavy equipment operation

Outside Contractors

- Perform all work in compliance with their company’s heavy equipment operation safety program, which will be reviewed and approved by the EHS/RM department
- If the company does not have a program, they must comply with this program

6. Hazards Associated with Heavy Equipment Operation

The following hazards associated with heavy equipment operation can lead to personal injury or death:

OHSA often sites “Struck by” as one of the top four causes of injury or death in the workplace. Most of these types of incidents involve being struck by heavy equipment.

- Personnel struck by heavy equipment
- Personnel crushed by heavy equipment
- Personnel crushed by loads dropped by heavy equipment
- Damage to buildings or utilities creating a hazard to personnel
- Falls from equipment
- Chemical exposure during fueling and maintenance activities
- Vehicle tipping or roll-over

7. Engineering Controls

Engineering controls are design plans or changes to the working environment to prevent or reduce employee exposure to heavy equipment operation hazards. The following example of engineering controls should be considered for heavy equipment operations.
• Provide proper areas for vehicle storage and maintenance
• Procure equipment meeting the specifications for the task to be performed
• Ensure heavy equipment is equipped with required safety devices for required tasks

8. Administrative Controls
Administrative controls are safe work practices and procedures designed to reduce the risks associated with working with ladders. Examples of administrative controls include the following:

• Train employees who work with and operate heavy equipment
• Perform routine inspections of heavy equipment to ensure they are in safe operating condition
• Immediate removal from service of any equipment found to be damaged or defective
• Prevent the use of old or obsolete heavy equipment at UAA sites

9. Procedures
Due to the size and power associated with heavy equipment the severity of resulting injuries has the potential to be severe. UAA personnel will follow the following procedures to mitigate hazards and avoid resulting injuries.

Work Planning
When tasks and projects require the use of heavy equipment departments should always plan the work to help identify and mitigate anticipated hazards before they happen.

As part of the planning process the following items should be taken into consideration:

• Do UAA personnel have the required training and certifications to perform the tasks
• Are procedures and manuals available for the equipment anticipated to be used
• Can a traffic plan be developed to streamline work/traffic flow and minimize intersections and the need to back up
• Set up limited access zone or swing radius around the heavy equipment
• Ensure all equipment has ROPS if applicable
• Ensure plans are in place for all required equipment maintenance
• Ensure proper cab protection and shielding is in place to protect the operator from the anticipated activities
• Increase visibility and lighting for night work
Spotters

Worker visibility and visual and verbal communication play an important role in ongoing safe operations. Blind spots can be a significant operator issue. A spotter, trained in hand signals, can help provide safety guidance and communication between the operator, workers and nearby pedestrians to compensate for blind spots.

Spotters should wear high-visibility clothing and stand clear of equipment, so they are visible to the operator at all times, and when feasible have the ability to communicate to operators through the use of radios or other communication device.

Operator Safe Work Practices

Operators should always be trained on the safe operation of and familiarize themselves with the following for the specific equipment to be used.

- Inspect the equipment at the start of each shift
- Adjust all side and back mirrors to help compensate for blind spots
- Ensure workers are clear of equipment before operating
- Acknowledge and allow safe passage to workers who alert you that they are approaching
- Avoid operating equipment parallel to slopes or embankments
- Turn off the engine and engage brakes before leaving equipment
- Face the equipment, maintaining three points of contact, while getting on and off the equipment
- Always wear the seat belt
- Avoid overloading vehicles
- Assess the work area and be familiar with the location of overhead energized utility lines by mobile cranes and poor ground conditions
- If equipment must be operated on the roadway or grade, ensure the roadway or grade is constructed and maintained to accommodate the safe movement of the equipment
- Operators shall never permit employees or other bystanders to pass under a suspended load

Heavy Equipment Requirements

Different types of heavy equipment vary greatly and the manufacturers instructions must be followed at all times, however the following apply to all equipment:
• No modifications or additions which affect the capacity or safe operation of the equipment shall be made without the manufacturer's written approval. If such modifications or changes are made, the capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly.

• All heavy equipment shall have a service braking system capable of stopping and holding the equipment fully loaded.

• Top loading vehicles must have cab shields and canopy protection.

• Heavy equipment capable of reverse with an obstructed view to the rear, shall not be used unless the equipment has in operation a reverse signal alarm.

• All heavy equipment capable of bi-directional movement, such as articulating tractors, skid-steamers, front-end loaders, backhoes, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction. The horn shall be maintained in an operative condition.

• Seat belts are required for heavy equipment when the operator is seated in the normal seating arrangement for operation. All seat belts shall meet the seat belt requirements of Society of Automotive Engineers J333a-1970, Operator Protection for Agricultural and Light Industrial Tractors.

• All heavy equipment shall be equipped with Roll Over Protective Structures (ROPS), unless designed for standup operation.

Fuel Handling and Storage

The handling and storage of liquid fuels such as gasoline shall be in accordance with the National Fire Protection Association (NFPA) Flammable and Combustible Liquids Code (NFPA 30). The handling and storage of liquefied petroleum gas fuel shall be in accordance with the Storage and Handling of Liquefied Petroleum Gases Code (NFPA 58).

Ground-Worker Awareness and Safe Work Practices

Ground workers also play an important role to help minimize the risk of heavy equipment-related injury.

• Wear high-visibility clothing when working around heavy mobile equipment.

• Avoid positioning themselves in a blind spot or riding on moving equipment.

• Avoid setting up their work area near heavy mobile equipment. The operator may not see them if they are bending over to work or grab a tool.
• Avoid walking or working under a suspended load
• Make eye contact with and alert the operator - and ensure the operator sees you - before approaching a vehicle
• Ride only in approved seats and wear a seat belt

Personnel who work around heavy equipment every day can become accustomed to the presence of heavy equipment, not giving much thought to the risks. It is critical personnel remain vigilant when working around heavy equipment and stay aware of the equipment position and movement to avoid being struck.

10. Inspections
To ensure heavy equipment at UAA are maintained in a safe condition and workers to not use defective equipment the following inspections are required:

Heavy equipment covered by this Program shall be inspected prior to each use by the operator using a safety inspection checklist developed by the responsible department. Records of the pre-use inspection checklist shall be maintained by the responsible department for a period of at least 5 years. Departments will use a manufacturer supplied, develop a checklist for the specific equipment being used, or use the checklist found in Appendix A.

The inspection shall include both a visual inspection list (e.g. Damage to hydraulic hoses?) and a function test list (e.g. Audible alarm works?). The safety inspection checklist shall be specific to the equipment.

If the equipment, attachments used on the equipment, or other conditions change that present new hazards, the pre-use inspection checklist shall be revised by the prior to putting equipment in service.

11. Training
UAA shall provide a training program for each employee operating or working with heavy equipment as necessary.

The program shall enable each employee to recognize hazards related their role in heavy equipment operations and shall train each employee in the procedures to be followed to minimize these hazards.

The employer shall ensure that personnel are trained by a competent person in the following areas, as applicable:

• A description and identification of the specific hazards associated with the equipment
• Specific personal protective equipment (PPE) required for operation of the equipment
• How to perform the pre-use inspection

• How to start, operate, and shutdown the heavy equipment safely in accordance with the manufacturer recommendations and this Program

Refresher training shall be provided at least annually.

Retraining shall be provided for each employee as necessary if an accident occurs, new workplace hazards are identified, a near loss incident has occurred, or there is a change in the type of equipment used, so that the employee maintains the understanding and knowledge acquired through compliance with this section.

12. Program Evaluation

The Heavy Equipment Operation Safety program shall be evaluated on an annual basis utilizing the protocols set forth by EHS/RM. The evaluation team will consist of a department safety coordinator and a designee from EHS/RM. EHS/RM will define the scope of the evaluation. The final report will be developed by the EHS/RM utilizing the information received during the evaluation. The deficiencies determined in the report will be documented and corrective action plans will be developed.

13. References

OSHA regulations that apply to Ladder safety are included below.

• 29 CFR 1926.651 Specific Excavation Requirements

• 29 CFR 1926.602 Motor Vehicles, Mechanized Equipment, and Marine Operations

• 29 CFR 1926 Subpart W App A - Rollover Protective Structures; Overhead Protection

14. Revision History

<table>
<thead>
<tr>
<th>Revision Number</th>
<th>Date Revised</th>
<th>Description of Change</th>
<th>Revised By</th>
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Appendix A: OPERATOR CHECKLIST

Inspection Information

<table>
<thead>
<tr>
<th>Date</th>
<th>Operator</th>
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<table>
<thead>
<tr>
<th>Truck#</th>
<th>Model#</th>
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<table>
<thead>
<tr>
<th>Department</th>
<th>Serial#</th>
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Safety and Operational Checklist (Have a qualified person correct all problems.)

<table>
<thead>
<tr>
<th>Engine Off Checks</th>
<th>OK</th>
<th>FIX</th>
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</thead>
<tbody>
<tr>
<td>Leaks – Fuel, Hydraulic Oil, Engine Oil or Radiator Coolant</td>
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<tr>
<td>Tires – Condition and Pressure</td>
<td></td>
<td></td>
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<tr>
<td>Forks, Top Clip Retaining Pin and Heel – Check Condition</td>
<td></td>
<td></td>
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<tr>
<td>Load Backrest – Securely Attached</td>
<td></td>
<td></td>
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<tr>
<td>Hydraulic Hoses, Mast Chains, Cables and Stops – Check Visually</td>
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<tr>
<td>Overhead Guard – Attached</td>
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<tr>
<td>Finger Guards – Attached</td>
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<tr>
<td>Propane Tank (LP Gas Truck) – Rust Corrosion, Damage</td>
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<td></td>
</tr>
<tr>
<td>Safety Warnings – Attached (Refer to Parts Manual for Location)</td>
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<tr>
<td>Battery – Check Water/Electrolyte Level and Charge</td>
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<tr>
<td>All Engine Belts – Check Visually</td>
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<tr>
<td>Hydraulic Fluid Level – Check Level</td>
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<tr>
<td>Engine Oil Level – Dipstick</td>
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<tr>
<td>Transmission Fluid Level – Dipstick</td>
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<tr>
<td>Engine Air Cleaner – Squeeze Rubber Dirt Trap or Check the Restriction Alarm (if equipped)</td>
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<tr>
<td>Radiator Coolant – Check Level</td>
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<tr>
<td>Operator's Manual – In Container</td>
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<tr>
<td>Nameplate – Attached and Information Matches Model, Serial Number and Attachments</td>
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</tr>
<tr>
<td>Roll Over Protection and Seat Belt – Functioning Smoothly</td>
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<tr>
<td>Hood Latch – Adjusted and Securely Fastened</td>
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<td></td>
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<tr>
<td>Brake Fluid – Check Level</td>
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</table>

<table>
<thead>
<tr>
<th>Engine On Checks – Unusual Noises Must Be Investigated Immediately</th>
<th>OK</th>
<th>FIX</th>
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<tbody>
<tr>
<td>Accelerator or Direction Control Pedal – Functioning Smoothly</td>
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<tr>
<td>Service Brake – Functioning Smoothly</td>
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<tr>
<td>Parking Brake – Functioning Smoothly</td>
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<tr>
<td>Steering Operation – Functioning Smoothly</td>
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<tr>
<td>Drive Control – Forward/Reverse – Functioning Smoothly</td>
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<tr>
<td>Tilt Control – Forward and Back – Functioning Smoothly</td>
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<tr>
<td>Hoist and Lowering Control – Functioning Smoothly</td>
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<tr>
<td>Attachment Control – Operation</td>
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<tr>
<td>Horn, Lights, and Audible Alarms – Functioning</td>
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<tr>
<td>Cab (if equipped) – Heater, Defroster, Wipers – Functioning</td>
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</tr>
<tr>
<td>Gauges: Ammeter, Engine Oil Pressure, Hour Meter, Fuel Level, Temperature, Instrument Monitors – Functioning</td>
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</table>

Any item requiring repair must be reported for supervisor