

University of Alaska Anchorage	Section EHS/RM
<b>ADMINISTRATIVE SERVICES MANUAL</b>	Program
<b>EHS/RM Programs</b>	Page 1
Title <i>MACHINE GUARDING</i>	Effective Date 10/08/2018

## 1. Purpose

University of Alaska Anchorage (UAA) employees, student workers, faculty, staff, and outside contractors exposed to unguarded or inadequately guarded machines in the workplace are at risk to injuries including amputations, lacerations, crushing injuries, abrasions, and deaths. This program establishes minimum requirements for guarding tools and equipment and protecting employees from injury.

## 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 machine guarding to protect people working at the University, by helping employees, student workers, faculty, staff, and outside contractors better understand the associated hazards.

## 3. Scope

This policy applies to UAA employees, students, faculty, staff, and outside contractors who work in areas where potential exposures to any machine where parts, functions, or processes may cause an injury.

## 4. Definitions

Device - A press control or attachment that restrains the operator from inadvertently reaching into the point of operation.

Enclosure - Guarding by fixed physical barriers that are either mounted on or around the moving parts of the machine/equipment.

Fencing - A locked fence or rail enclosure that restricts access to the machine, except by authorized personnel. The dangerous operation of the machinery must be at least 42 inches away from the fencing.

Guard - A barrier (fixed or movable) that prevents contact with moving parts. Guards are more protective and are preferred over devices.

In-going Nip Points - Two or more mechanical components rotating in opposite directions in the same plane and in close conjunction or interaction.

Pinch Point - Any place where a body part can be caught between two or more moving parts.

Point-of-operation - The point at which cutting, shaping, boring, forming, or processing is accomplished on or within the equipment.

University of Alaska Anchorage	Section EHS/RM
<b>ADMINISTRATIVE SERVICES MANUAL</b>	Program
<b>EHS/RM Programs</b>	Page 2
Title <i>MACHINE GUARDING</i>	Effective Date 10/08/2018

## 5. Authority and Responsibilities

In addition to the roles and responsibilities outlined in the UAA Training Program, the following apply to the Machine Guarding Program.

### EHS/RM

- Assist departments to determine proper machine guarding is used for specific equipment
- Create, track, and/or conduct inspections on machine guards where applicable with this standard

### Supervisor

- Ensure defective, damaged, or prohibited equipment and guards are removed from service
- Conduct periodic inspections of machine guards in their department to ensure integrity
- Assist in the determination of safe methods to work with equipment when guards are determined to be unsafe due to required work tasks
- Ensure employees are properly trained in this machine guarding program for the use of equipment in their work areas

### Department Safety Coordinator

- Assist in the determination of equipment requiring guarding
- Conduct periodic inspections of machine guards in their department to ensure integrity
- Assist in the determination of safe methods and procedures for working with equipment when administrative controls are required
- Ensure assigned machine operators are trained on the Machine Guarding Program
- Conduct machine inspections to ensure there are proper safeguards

### Employees

- Visually inspect equipment and guards prior to each use
- Verifies guards are in place and operations prior to using equipment
- Alerts department supervisor when equipment/guards require replacement before using equipment
- Assesses work to determine if additional guarding is required

### Outside Contractors

- Perform all work in compliance with the company's approved machine guarding program, which will be reviewed and approved by the EHS/RM department

University of Alaska Anchorage	Section EHS/RM
<b>ADMINISTRATIVE SERVICES MANUAL</b>	Program
<b>EHS/RM Programs</b>	Page 3
Title <i>MACHINE GUARDING</i>	Effective Date 10/08/2018

- If the contracting company does not have a program, they must comply with this program

## 6. Hazards Associated with Inadequately Guarded Machines

A wide variety of mechanical motions and actions can present hazards to employees. These can include movement of rotating members, reciprocating arms, moving belts, cutting teeth, pinch points, and other parts that can impact or shear. The basic types of hazardous of hazardous mechanical motions and actions are:

- Rotating (including in-running nip points)
- Reciprocating
- Transversing
- Cutting
- Punching
- Shearing
- Bending
- Tipping

Rotating motion can be dangerous; even smooth, slowly rotating shafts can grip clothing, and through mere skin contact force an arm or hand into a dangerous position. Injuries due to contact with rotating parts can be severe. Cutting action may involve rotating, reciprocating, or transverse motion. The danger of cutting action exists at the point of operation where finger, arm, and body injuries can occur. Additionally, the process may create flying chips or scrap material that can strike the head, particularly in the area of the eyes or face. Such hazards are often present at the point of operation in cutting wood, metal, or other materials.

## 7. Engineering Controls

Engineering controls are design plans or changes to the working environment to prevent or reduce employee exposure to hazards. The following example of engineering controls should be considered in area design to reduce the risk of hazards.

- If feasible, design the facility, equipment, or process to remove the hazard or substitute something that is not hazardous
- If removal is not feasible, enclose the hazard to prevent exposure in normal operations
- Where complete enclosure is not feasible, establish barriers or local ventilation to reduce exposure to the hazard in normal operations

University of Alaska Anchorage	Section EHS/RM
<b>ADMINISTRATIVE SERVICES MANUAL</b>	Program
<b>EHS/RM Programs</b>	Page 4
Title <i>MACHINE GUARDING</i>	Effective Date 10/08/2018

## 8. Administrative Controls

Administrative controls are safe work practices and procedures designed to reduce the risks associated with moving equipment. Examples of administrative controls include the following:

- Train employees on equipment use and hazards prior to work with machinery
- Conduct routine inspections of machine guarding to ensure they are in safe working condition
- Immediately remove from service any equipment with guards that are found to be damaged or defective
- Provide employees with the tools to use the equipment safely

## 9. Procedures

When using different types of equipment employees will encounter many hazards created by moving machine parts. Each piece of equipment employees use during the course of their work duties shall be inspected to determine hazards associated with each specific piece of equipment. Safeguards are essential for protecting workers from equipment and preventable injuries.

A good rule to remember is dangerous moving parts which generally require safeguarding fall in three basic areas:

- The point of operation: that point where work is performed on the material, such as cutting, shaping, boring, or forming of stock.
- Power transmission apparatus: all components of the mechanical system that transmit energy to the part of the machine performing the work. These components include flywheels, pulleys, belts, connecting rods, couplings, cams, spindles, chains, cranks, and gears.
- Other moving parts: all parts of the machine that move while the machine is working. These may include reciprocating, rotating, and transverse moving parts, as well as feed mechanisms and auxiliary parts of the machine

### **Machine Safeguarding Guidelines**

- Prevent contact: The safeguard must prevent hands, arms, and any other part of an operator's body from contacting dangerous moving parts. A good safeguarding system eliminates the possibility of the operator or another worker placing parts of their bodies near hazardous moving parts.
- Secure: Operators should not be able to easily remove or tamper with the safeguard, because a safeguard that can easily be made ineffective is no safeguard at all. Guards and

University of Alaska Anchorage	Section EHS/RM
<b>ADMINISTRATIVE SERVICES MANUAL</b>	Program
<b>EHS/RM Programs</b>	Page 5
Title <i>MACHINE GUARDING</i>	Effective Date 10/08/2018

safety devices should be made of durable material that will withstand the conditions of normal use. They must be firmly secured to the machine.

- Protect from falling objects: The safeguard should ensure that no objects can fall into moving parts. A small tool dropped into a cycling machine could easily become a projectile that could strike and injure someone.
- Create no new hazards: A safeguard defeats its own purpose if it creates a hazard such as a shear point, a jagged edge, or an unfinished surface that could cause a laceration. Guard edges, for example, should be rolled or bolted in such a way to eliminate sharp edges.
- Create no interference: Any safeguard that impedes an operator from performing the job quickly and comfortably might soon be overridden or disregarded. Proper safeguarding may enhance efficiency since it relieves the operator's apprehensions about injury.
- Allow safe lubrication: If possible, workers should be able to lubricate the machine without removing the safeguards. Locating oil reservoirs outside the guard, with a line leading to the lubrication point, will reduce the need for the operator or maintenance operator to enter the hazardous area.

### **Unauthorized Removal of Machine Safeguards**

UAA does not tolerate the unauthorized removal of machine safeguards. Any employee found to have removed a machine safeguard without supervisor approval will be subject to disciplinary actions up to and including termination.

### **Safe Work Practices**

Besides machine guarding, there are other safe work practices that can be followed to help prevent injuries associated with moving machinery, i.e. amputation type injuries.

- Avoid loose clothing or jewelry and tie up loose hair to prevent it from becoming entangled in the moving parts
- Use push sticks and tampers for pushing material into the point of operation. NEVER reach your hand toward the point of operation
- Allow time for machine to stop moving once turned off. Some blades will take up to 15 seconds to spin down when powered down
- Ensure the machine is unplugged or locked and tagged out before removing guards for cleaning or maintenance
- Use the proper blades at manufacturer specified equipment operating speeds
- Maintain blades and bits in good condition and replace when damaged

University of Alaska Anchorage	Section EHS/RM
<b>ADMINISTRATIVE SERVICES MANUAL</b>	Program
<b>EHS/RM Programs</b>	Page 6
Title <i>MACHINE GUARDING</i>	Effective Date 10/08/2018

## **Securing Equipment**

Whenever possible machines and equipment should be secured and or anchored to prevent accidental movement or tipping of the equipment while in use. Equipment can be anchored to the floor or to a wall with adequate strength to prevent the equipment from moving as a result of contact with expected force.

## **10. Inspections**

All new equipment and machines shall be inspected by the supervisor after setup and before being placed into service. Follow-up inspections will be completed every two years. Assistance from the EHS/RM is available upon request. All guards that came standard from the manufacturer must be in place and operational before use. Supervisors and machine operators will visually inspect their machine's safeguards before every shift.

Each machine will be thoroughly inspected in accordance with department procedures or by utilizing the inspection checklist in Appendix A. Machines that do not pass inspection will be taken out of service. Any machine taken out of service will be isolated from its energy source(s) using the proper isolation method in the UAA Lockout/Tagout Program and an out of service sign or tag will be promptly attached to the machine.

After all safeguarding issues found during the inspection are corrected, the supervisor will authorize the machine to be put back into service.

## **11. Training**

All UAA employees who operate machines as part of their job will be trained on Machine Guarding and Operation initially upon assignment and annually thereafter. Training will be provided by EHS/RM or their designee. This training shall cover:

- Identifying the hazards associated with the machines they work with
- The written procedures for each machine they operate
- Types of safeguards and how they provide protection from hazards
- How to use the safeguard
- How and under what circumstances the safeguarding can be removed
- What to do if a safeguard is damaged, missing or is not providing adequate protection
- The types of personal protective equipment (PPE) that should be worn around their assigned machines

Retraining will be conducted for any employee if:

University of Alaska Anchorage	Section EHS/RM
<b>ADMINISTRATIVE SERVICES MANUAL</b>	Program
<b>EHS/RM Programs</b>	Page 7
Title <i>MACHINE GUARDING</i>	Effective Date 10/08/2018

- There is a change in assignment that involves using a different machine
- There is a change in the machine, equipment or processes that presents new hazards
- There is a change in the machine safeguarding procedures
- The supervisor has reason to believe or determines through inspection or observation that an employee lacks sufficient knowledge of the safeguarding procedures

## 12. Program Evaluation

The Machine Guarding 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. This review will consider any new machines, changes in processes, facility layout changes and the cost and frequency of machine-related injuries. 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 Machine Guarding safety are included below.

- 29 CFR 1910 Subpart O
- 29 CFR 1926 Subpart I

## 14. Revision History

Revision Number	Date Revised	Description of Change	Revised By	Approved By
0	10/08/2018	Initial Issue		VC Shuford
1				
2				
3				

Appendix A – Machine Safeguarding Inspection Checklist

Date of Audit:				Date of Last Inspection:						Inspected by (list all present):					
Equipment Name & Number:															
Requirements For All Safeguards	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments
Do the safeguards prevent workers’ hands, arms and other body parts from making contact with dangerous moving parts?															
Are the safeguards firmly secured and not easily removed?															
Do the safeguards ensure that no object will fall into the moving parts?															
Do the safeguards permit safe, comfortable, and relatively easy operation of the machine?															
Can the machine be lubricated without removing the safeguard?															
Is there a documented process for shutting down the machine before safeguards are removed?															
Can the existing safeguards be improved?															
Point of Operation Mechanical Hazards	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments
Is there a point of operation safeguard provided for the machine that keeps the operator's hands, fingers, and body out of the danger area?															
Is there evidence that the safeguards have been tampered with or removed?															
Is there a more practical or effective safeguard?															
Could changes be made on the machine to eliminate the point of operation hazard?															
Power Transmission Apparatus Hazards	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments
Are there any unguarded gears, sprockets, pulleys or flywheels on the apparatus?															
Are there any exposed belts or chain drives?															
Are there any exposed setscrews, keyways, collars, etc.?															
Are starting and stopping controls within easy reach of the operator?															
If there is more than one operator, are separate controls provided?															
Other Moving Parts	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments
Are safeguards provided for all hazardous moving parts of the machine including auxiliary parts?															
Electric Hazards	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments	Yes	No	Comments
Are there loose conduit fittings?															
Is the machine properly grounded?															
Is the power supply correctly fused and protected?															
Do workers occasionally receive minor shocks while operating the machine?															