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Purpose

The purpose of the Moving Equipment Policy is to protect individuals from the hazards associated with moving equipment. The policy specifies the minimum requirements to prevent exposures and identify the requirements for the design, fabrication and installation of guards and other protective devices. It also provides a framework for assessing and reducing risks associated with tasks required to be performed within the boundaries of machinery and moving equipment not in a Zero Energy State.

Definitions

Authorized Personnel: Team members who by job duty are authorized to perform assigned tasks within the boundaries of moving equipment and have reviewed the moving equipment procedures for the equipment of their assigned responsibilities. (Examples: operators and area coordinators, area maintenance tech, area maintenance supervisors and area engineers).

Affected Personnel: Team members who work in the areas where moving equipment is operated whom have not reviewed the moving equipment procedures for a given piece of equipment. These team members can only enter a moving equipment area under one of the following conditions:

- When accompanied by an authorized team member.
- After receiving instruction about the hazards of the moving equipment in the area from the Authorized team member; or
- When the equipment is locked out per ZES lockout procedures.

Barrier: A wall, screen, fence or railing or similar structure provided to restrict access to an area where moving parts or equipment are located.

Boundary: A border or limit designated to minimize activities or access to areas containing moving equipment. Boundaries separate an area that contains moving equipment from areas that are free of moving equipment. Boundaries may be visually indicated by markings on the floor, machine, or other means, or they may be descriptive of the three-dimensional planes of the equipment. Typical boundaries include machine frames, guards, handrails, barricades, or blue lines painted on the floor.

Barrier-type guard: A type of guard that does not completely enclose the point of operation or moving equipment due to the machine configuration but restricts access to the point of operation or moving equipment.

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Guard/Guarded/Guarding: A structure, barrier, enclosure, or protective device used to prevent team members access to moving equipment components.

Hazardous Energy: Any level of energy present that can cause injury through means such as electrical, mechanical, unexpected/unwanted movement, activation or flow that could result in injury.

Interlock: An electrical or mechanical device that interrupts process or equipment operation, prevents unauthorized operation, or prevents access during operation. Interlocks are used to supplement guarding methods specified by this guideline.

Mechanical Power Transmission Apparatus: The mechanical components that, together with a prime mover, provide the motion to an element of a machine or equipment. Examples include couplings, drive shafts, belt, pulley, sprocket, and chain drives.

Moving Equipment: Any machinery, equipment, process, or component thereof, containing moving parts or mechanisms that create hazards of cutting, pinching, shearing, in-running nips, etc.

Moving Equipment Procedures: Procedures that explain the hazards of the moving equipment and how to safely perform specific work procedures around that equipment. One piece of moving equipment may have several procedures that are specific to the various tasks that take place within the moving equipment boundary. Procedures are also written for inspection of the equipment by maintenance and operations personnel.

Nip/Pinch Points: Any location where it is possible for a part of the body to be caught between the moving parts of the machine or by moving and stationary parts or objects.

Presence Sensing Device: A protective device that interrupts a machine cycle or operation when an electromagnetic or visible light field protecting the point of operation is entered.

Prime Mover: Any steam, gas, oil, or air engines, motors; steam or hydraulic turbines; electric motors; or other equipment used as a source motive of power.

Protective Device: A control or attachment that prevents access to the point of operation and is interlocked to interrupt the equipment or machine operation.

Risk Assessment: A systematic method for identifying and evaluating hazards associated with tasks around moving equipment to identify methods to eliminate or reduce the risk of each task. These are typically documented as part of an operating procedure.

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Two Hand Operating Device: Controls that require both hands of the operator in a specific place outside the point of operation for a machine to start and complete a cycle. Examples include the core cutter operator station.

Execution

A. General Requirements

1. All moving equipment exposures shall be guarded in accordance with the requirements outlined in this policy and as further defined by OSHA requirements.
2. Each operating department will determine what equipment within their area meets the definition of moving equipment and requires personnel to perform assigned tasks.
3. Boundaries shall be established around moving equipment for the purpose of restricting access and activities within these boundaries, with appropriate signage and marking, or barriers provided. Boundaries around affected equipment without physical barriers or guards will be indicated by colored lines, barrier rails, signage, etc.
4. Authorized personnel Team members who by job duty are authorized to perform assigned tasks within the boundaries of moving equipment and have reviewed the moving equipment procedures for the equipment of their assigned responsibilities. (Examples: operators and area coordinators, area maintenance tech, area maintenance supervisor. Authorized personnel are allowed to enter the boundary areas of moving equipment to perform work while the equipment is energized. They have reviewed the procedures for the equipment they need to cross the boundaries.
 - a. Note: Moving Equipment Procedures for individual pieces of equipment each have different requirements for operator notification. Some procedures require operator notification prior to crossing a moving equipment boundary while others do not. Even if not required, it is recommended to contact the operator prior to crossing a moving equipment boundary. The individual operating departments will decide what is required for operator notification and this will be included in the moving equipment procedures.
5. Affected personnel- Team members who work in the area where moving equipment is operated who have not reviewed the moving equipment procedures for a given piece of equipment. These team members can only enter a moving equipment area under one of the following conditions:
 - a. When accompanied by an authorized team member.

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- b. After receiving instruction about the hazards of the moving equipment in the area from the Authorized team member; or
- c. When the equipment is locked out per ZES lockout procedures.
 - 1. Note: Affected team members may become authorized team members by reviewing the moving equipment procedures for a given piece of equipment. Affected team members generally are suppliers, visitors, office personnel and shift maintenance techs who have not reviewed the moving equipment procedures for a given piece of equipment. They can also be team members of different operating departments who have not reviewed the moving equipment procedures for a given piece of equipment.
- 6. A risk assessment shall be performed for all predictable tasks, including those performed during upset conditions, within the boundaries of the moving equipment. The risk assessment process is outlined in Appendix A.
- 7. Control measures identified through the risk assessment shall be implemented to eliminate or reduce potential exposure to moving equipment.
- 8. Moving equipment procedures and risk assessment information for tasks performed within the boundaries of moving equipment must be available in each work area by manual and/or on the DMS to ensure access to all affected and authorized personnel.
- 9. Training must be provided for all authorized personnel who are expected to work within moving equipment boundaries. Affected personnel will be advised of the hazards of moving equipment, boundaries and procedures to ensure their safety when working in the general area of moving equipment.
- 10. Pre-startup alarms (audible or audible/visual, automatic or manually initiated) will be provided for moving equipment as follows:
 - a. When authorized or affected personnel have the potential to perform tasks within the boundaries of moving equipment that place them at risk of unexpected startup, and
 - b. When clear means for visual identification and warning (i.e. walkdown procedures, clear line of sight, etc.) are not otherwise in place to assure that personnel are not within the boundaries prior to equipment being started, or
 - c. When direct communication by person-to-person radio is not available.

B. Guarding Requirements

- 1. All prime movers, power transmission equipment, points of operation and other moving parts shall be guarded by enclosure, location, distance or protective devices.
- 2. All exposed fan blades within seven feet of the floor or working surface shall be enclosed with a guard with openings no larger than one half (1/2) inch.

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3. All machines designed for use in a fixed or permanent location shall be secured to prevent movement during operation.
4. Guards will be fastened or secured to prevent accidental removal.
5. Performance of the machine or equipment shall not be impaired by the function of the guard. Installation of guards must be done in a manner so as to not create a new hazard.
6. When job tasks such as lubrication, adjustment or diagnostic procedures must be performed when equipment is operating, provisions will be made to keep guards in place and protective devices functional. Special openings, feed tubes for lubrication, extensions and other measures may be used to prevent team member exposure. The cover of the opening must require a tool to open it.
7. Performance of some tasks during machine operation may require the removal of guards or protective devices. Equivalent protective measures and work practices will be established and used in these situations. Team members shall not be exposed to mechanical hazards or other hazardous energies while performing these tasks. Access to such points must be addressed by either the ZES/Lockout policy or Moving Equipment procedures.
8. Automated systems shall be guarded to prevent team member contact. This may be accomplished through barrier guards, interlocks and presence sensing devices. Automated systems that are not fully enclosed shall be equipped with audible and visible warning systems capable of alerting pedestrians of their presence and/or operation.
9. Additional requirements beyond the general guarding requirements listed below can be found in the above-mentioned guideline, or as specified by OSHA.

C. Moving Equipment Risk Assessment and Procedures

1. This section of the policy covers equipment and processes that require job tasks to be performed in the presence of moving parts or mechanisms.
 - a. Exception: This section does not apply to equipment not covered by this section of the policy include: equipment with a single energy source, plug in type shop or lab equipment, conveyor belts, and machinery that is completely guarded with fully enclosing guards that are not removed except while in Zero Energy State (ZES) conditions.
2. Risk assessments are required for tasks performed within the boundaries of moving equipment, to supplement guards, protective devices, and ZES/IES procedures. Appendix A (Moving Equipment Risk Assessment and Procedures) contains a format for documenting the risk assessment process. The general requirements for conducting a risk assessment and developing procedures are as follows:

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- a. Forming an appropriate team to conduct the risk assessment.
 - b. Identification of equipment boundaries.
 - c. Identification of all predictable tasks performed inside the boundaries, including those performed during upset conditions.
 - d. Analysis of each task for risk and if the risk can be eliminated or minimized.
 - e. Identification of safety systems, controls, administrative controls, PPE, etc. that are in place or required to safely perform the task.
 - f. Developing a procedure to safely perform the task.
 - g. Communication, training and maintenance of procedures.
3. Risk assessments and/or procedure updating will be performed when the procedures of the machinery change, new processes or equipment are introduced into the work environment, or facility layout changes.

D. Training

1. Authorized personnel whose job tasks require them to work within the boundaries of moving equipment must be trained on the requirements of this policy, and the following:
 - a. Boundaries
 - b. Authorized tasks
 - c. Hazards of each task
 - d. Safe work practices (procedures) required to safely perform each task
2. Initial training will be provided to authorized personnel prior to assignment of job tasks requiring entry within moving equipment boundaries.
3. Additional training will be provided to authorized personnel as necessary such as when significant additions or changes are made to the approved tasks or procedures or when necessitated by incidents.
4. Training of authorized personnel will be documented, and records retained by the operating department.
5. Affected personnel will receive training on this policy, moving equipment boundaries and access to equipment.

Responsibility

- A. Operating departments are responsible for ensuring that all equipment within their areas is provided with appropriate guarding and protective devices per the criteria established in this policy.

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- B. Operating departments are responsible for identifying moving equipment, designating equipment boundaries, conducting and documenting risk assessments, and resolving issues identified during the risk assessment process. Maintenance techs for the area should be involved with the risk assessment so their rounds can be incorporated into the procedures for rounds.
- C. Operating departments are responsible for developing and maintaining up to date procedures, training and documentation for their authorized personnel.
- D. Maintenance is responsible for ensuring the integrity of guarding through periodic repair and modifications that assure compliance with this policy.
- E. Maintenance supervisors shall assure that new equipment installations are provided with guarding and protective devices meeting the requirements of this policy.
- F. Each team is responsible for communicating expectations to their affected personnel regarding moving equipment boundaries, and access to equipment.

APPENDIX A

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MOVING EQUIPMENT RISK ASSESSMENT AND PROCEDURES PROCESS

The risk assessment will be conducted by a team of individuals with operational and technical knowledge of the moving equipment, and the tasks that can be expected to be performed. The method for conducting the risk assessment is as follows:

1. Identify the boundaries of the equipment.
2. Identify all predictable tasks performed inside the boundary of the equipment while the machine is fully energized or in an IES state. Include tasks that may be performed by operations, maintenance, and service representatives. Examples include threading, jam removal, cleaning, adjusting, troubleshooting, inspections, lubrication, and sampling.
3. Analyze each task identified for potential risk. Use the questions provided on the following page to review the tasks. This analysis will focus on the following items:
 - a. Is the task required to be performed within the boundaries? If an alternate means is available for performing the task where personnel do not have to enter the boundaries, this should be considered as the best and safest alternative.
 - b. If the task must be performed, document the reasons why the task is necessary.
 - c. Identify who is authorized to perform the tasks, including the required number of personnel to safely perform the job.
 - d. Evaluate and document the hazards (nip/pinch points, crush potentials, caught between, etc.) that are present when the task is being performed. Consider any opportunities for improvement. Priority for reducing potential hazards is as follows:
 - i. Eliminate exposure, examples include: perform task under Zero Energy State conditions. Add additional guarding to prevent exposure to moving equipment. Perform the task from outside the boundary with tools.
 - ii. Reduce exposure, examples include: reduce the frequency of the task, provide partial automation, provide partial guarding, perform the task under Intermediate Energy State.
 - iii. Add protective measures, to the existing method for performing the task, examples include: develop additional PPE requirements, reduce the number of individuals authorized to perform the task, conducting observations, etc.
4. Identify and document the safety systems, controls, administrative controls, PPE, etc. that are in place or required to safely perform the task or needed to protect against the specific hazards identified. Consider any opportunity for improvement.

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5. Develop the procedural steps required to safely perform the task (see last page of this appendix for further guidance). Document the risk evaluation and procedures for the task in the same document, following the format included in the appendix.
6. Conduct a formal review and approval of the procedures and issue within the operating department and on the DMS.
7. For identified improvements (change in work practices, tools, PPE, light curtains, etc.), the department is responsible for resolution in a timely fashion, including any updates to the moving equipment procedures.

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Risk Assessment Checklist

The following questions are provided as a tool/checklist to ensure appropriate review of each of the job tasks that are necessary within moving equipment boundaries. Results of reviews are to be captured in the documentation of the moving equipment procedures (*see next page*).

Job Tasks/Boundaries/Authorization

- Does the task have to be done within the boundaries?
- Are the moving equipment boundaries clearly identified (painting, signage, barricade, etc.)
- Do team members have to cross the boundary of the high-risk area during operation for reasons other than performing the task (path of travel, in harm's way)?

Hazards/Risks/Guarding

- What are the primary hazards in this job (nip/pinch, caught between, struck by, etc)
- Are all pieces of moving equipment fully enclosed or otherwise guarded (barriers, distance, etc.) so that they are out of reach of team members?
- Are partially guards provided where complete guards would impede equipment operation?
- Are all nip points effectively guarded?
- Are mechanical power transmission devices effectively guarded?

Safety Systems/Tools/PPE

- Are there any interlocks, light curtains, etc. provided to prevent startup or cause shutdown of equipment when team members are performing the task?
- What tools are necessary to perform the task safely? Are they adequate?
- What PPE is provided to perform the task? Is it adequate?
- Is the equipment provided with pre-startup alarms? If so, what is their operation?
- Are means provided for emergency shutdown? What are they?
- Are protective devices provided specifically to prevent operator injury (light beams, safety gates, two hand operating devices, etc.)
- Have maintenance practices been established for periodic testing of safety controls?

Procedures

- If the task were conducted under full lockout/zero energy state (ZES) condition, does this reduce the overall risk to the team member? Is this practical? Can the task be performed under partial lockout (intermediate energy state (IES)) procedure?
- What special or unique hazards can occur in the process of conducting the task?
- What procedural steps must be performed in a specific order to prevent injury?
- How many personnel are required to perform this task safely? Are there steps that require additional personnel beyond those initially required?

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Moving Equipment Procedures – Risk Assessment Documentation

The following example format is recommended for documenting and communicating the results of the risk assessment process, and the job task procedures. These sections correspond to the previous risk assessment questions.

Dept.: Name:	MOVING EQUIPMENT PROCEDURE Risk Assessment Documentation	Revised: Page No.: 1 of 1
Task: <i>Name of Job Task Covered by Procedure</i>		

INTENT

Why the task is necessary (i.e. this procedure is necessary to safely thread up the machine)

BOUNDARIES

A description of the boundaries around the equipment where only authorized personnel are allowed to enter to perform the task, either designated by description or marking (i.e. the area of windup stations within equipment).

AUTHORIZED PERSONNEL

Which personnel are authorized to be within the boundary area when the task is performed, and number of personnel necessary to perform the assigned task.

HAZARDS/RISKS IDENTIFIED

Identify and document the hazards (pinch, nip, caught between, struck by, etc.) and risks that may be present when performing the task. The summary can be used to communicate risks when providing training.

SAFETY SYSTEMS/TOOLS/PPE

Identify the guarding, systems, tools, PPE, etc. that must be operational, used, or in place for the tasks to be performed safely. This could be an inventory of key safety items, including use of emergency shutdown systems, interlocks, guard positions, equipment features, etc. This summary can be used for training on what is provided or required, and why.

PROCEDURE

- 1) *Each step should be a complete, concise statement of what is to be performed, and to what extent.*
- 2) *Detail must be clearly written so that it is understood by department personnel expected to perform the task.*
- 3) *Steps should include notes, cautions and warnings where appropriate, with emphasis provided by boldface or other means for cautions, and/or warnings where a particular risk is created during the procedure.*

NOTE: The department may choose to identify the author, date approved, reviewed and issued.

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