WELCOME – STEP 1

1. Welcome to the January 2024 Safety Toolkit – Machine Guarding. You play an important role in the health and safety across the company, and we thank you for your contribution! Without your focus and dedication to making safety a priority, our people would suffer, our clients would suffer, and our families would suffer. We hope you find the safety tools provided in this Toolkit and in Toolkits like this in the coming months as just some of the many resources afforded to you to communicate Machine Guarding. As always, the work you do matters, and we are so grateful to have you on the team!

HOW TO USE THIS SAFETY TOOLKIT

1. Supervisor/Lead Script – Start Here! Way to go! Now keep reading and you'll be all set. This script sets you up for success.
2. Supervisor/Lead PowerPoint – Use this as a training moment for your team. Everything you need to know and communicate for each slide is contained in this script! Skip ahead if you are ready to give this training to your team. It's always a good time to learn about Machine Guarding. The presentation should last about 1 hour depending on group participation.
3. Teaching Tool – We have included a Machine Guarding Quiz and Answer Key to test your knowledge.
4. Site Communication Poster – A PDF version of the monthly infographic if you would like to display it at your workplace.
5. Sign-In Sheets – Please complete this form when completing Machine Guarding training and turn-in to the appropriate point of contact as a record of training.
6. What's next? – Use this QR code for yourself AND share it amongst everyone on your team for additional safety resources based on the theme of Machine Guarding. Look for Interactive resources, recommendations for phone apps, checklists, handouts, and more. Check it out!

SUPERVISOR/LEAD POWERPOINT SCRIPT – STEP 2

NOTES ON THESE SLIDES:

- KLP: Key Learning Point (objective of the slide)
- F: Facilitator

Slide 1: Title Page (30 Seconds)

KLP: You set the tone. If you believe safety is important, the audience will believe safety is important.

The facilitator opens the session by welcoming everybody to the training and noting the monthly focus – Machine Guarding.

F: Today's task is to attend training on Machine Guarding. Cell phones should be turned off or silenced during this training. If you need to take a call, please go to (designated area), take the call, and return as soon as possible. {Address any other important announcements or business now.}

Slide 2: Housekeeping (1 Minutes)

KLP: Opportunity for a HSE (Health Safety and Environmental) Moment

F: Prior to training, determine if any fire drills are planned and the response expected from the facility and muster points if alarms should go off. It is important to remind employees that should they need to leave the location at any time, they should inform the Facilitator because, in the event of a fire incident, we need to know their whereabouts. This is an opportunity right at the start of the day to brief the employees on HSE procedures in general for the running of the training course. [If your job site is outdoors, do not overlook this safety moment. Adjust the plan in the event of a job site fire.]

F: Hello Team, I have verified with the HSE department and have confirmed that there are no Fire Drills or Emergency Drills scheduled for today. If we hear an alarm, we will follow site protocol for emergency response.

F: {Point out the fire exits and muster point}

F: Once we are at the muster points, we will do a role call to account for all attendees.

Slide 3: Presenter (2 Minutes) & Introductions (5 Minutes)

F: {This is your moment! This is a chance to visibly "Walk the Talk"}

Share:

- Your personal experience of safety and impact on the company.
- Importance of making the most of this opportunity to think about the importance of HSE and discuss with employees.
- Appreciate that you are a leader and that you make an impact.
- Importance of taking personal responsibility to make a positive impact.
- You get out of this training what you put into it.
- HSE matters to our company.
- The safety program is going to help people feel empowered and take the initiative to improve their own HSE performance through proactive attitudes and behaviors.

You may wish to share:

- A story of your experience in the safety program and how it has changed the way in which you behave.
- Some lessons learned from an incident when you have been involved in the investigation, highlighting the devastating impact that accidents have on people's lives, or you can describe your experience of being involved in an environmental incident. How did this affect the company, and more importantly, affect the lives of others not working for the company?

F: Go around the room and ask everyone to give their name and what their position is. {Wait for their responses, smile, and nod as they participate. Be careful about timing here---if you ask an additional intro question of the participants and give a long-winded answer yourself, your participants will follow with long stories/explanations, and you can accidentally take up a lot of time.}

Slide 4: Why am I here? (1 Minute)

F: Each one of us is the last line of defense to protect workers from injury or the environment from damage, should management systems and collective protections fail. Supervisors and workers are the KEY to HSE. We can promote or destroy the HSE climate through our own behavior and how other workers perceive it.

F: Supervisors and workers are responsible for enforcing safety rules. Regardless of our position, employment status, or background, everyone is responsible for HSE, and everyone can be a HSE leader by demonstrating positive attitudes and behavior.

Slide 5: Importance of Machine Guarding (1 Minute)

F: Employee exposure to unguarded or inadequately guarded machines is prevalent in many workplaces. Consequently, workers who operate and maintain machinery suffer approximately 18,000 amputations, lacerations, crushing injuries, abrasions, and over 800 deaths per year. Amputation is one of the most severe and crippling types of injuries in the occupational workplace, and often results in permanent disability.

F: The purpose of machine guarding is to protect the machine operator and other employees in the work area from hazards created by ingoing nip points, rotating parts, flying chips and sparks.

(https://www.osha.gov/etools/machine-guarding)

Slide 6: Pinch Point Safety – Understanding the Hazards (5:19 Minutes)

VIDEO – 5:19 Min

(Click play to play clip)

Slide 7: Parts of Machines (2 Minutes)

F: All machines consist of three fundamental areas: the point of operation, the power transmission device, and the operating controls.

F: The point of operation is where work is performed on the material, such as cutting, shaping, boring, or forming of stock.

F: A power transmission device transmits energy to the part of the machine performing the work. Includes flywheels, pulleys, belts, connecting rods, couplings, cams, spindles, chains, cranks, and gears.

F: The operation controls control machine mechanisms.

F: Other moving parts can include reciprocating, rotating, and transverse moving parts, feed mechanisms, and auxiliary parts of the machine.

F: Despite all machines having the same basic components, their safeguarding needs widely differ due to varying physical characteristics and operator involvement.

(https://www.osha.gov/etools/machine-guarding)

Slide 8: Hazardous Motions and Actions (2 Minutes)

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Slide 9: Hazardous Motions (4 Minute)

F: The basic types of hazardous motions include rotating, in-running nip points, reciprocating, and transversing.

F: Rotating motions can be dangerous; even smooth, slowly rotating shafts can grip hair and clothing, and through minor contact force the hand and arm into a dangerous position. Injuries due to contact with rotating parts can be severe. Collars, couplings, cams, clutches, flywheels, shaft ends, spindles, meshing gears, and horizontal or vertical shafting are some examples of common rotating mechanisms which may be hazardous. The danger increases when projections

such as set screws, bolts, nicks, abrasions, and projecting keys or set screws are exposed on rotating parts.

F: In-running nip point hazards are caused by the rotating parts on machinery. There are three main types of in-running nips.

- Parts can rotate in opposite directions while their axes are parallel to each other. These parts may be in contact (producing a nip point) or in close proximity. In the latter case, stock fed between two rolls produces a nip point.
- Nip points are also created between rotating and tangentially moving parts. Some examples would be: the point of contact between a power transmission belt and its pulley, a chain and a sprocket, and a rack and pinion.
- Nip points can occur between rotating and fixed parts which create a shearing, crushing, or abrading action. Examples are: spoked handwheels or flywheels, screw conveyors, or the periphery of an abrasive wheel and an incorrectly adjusted work rest and tongue.

F: Reciprocating motions may be hazardous because, during the back-and-forth or up-and-down motion, a worker may be struck by or caught between a moving and a stationary part.

F: Transverse motion (movement in a straight, continuous line) creates a hazard because a worker may be struck or caught in a pinch or shear point by the moving part.

(https://www.osha.gov/etools/machine-guarding)

Slide 10: Hazardous Actions (4 Minutes)

F: The basic types of hazardous actions are cutting, punching, shearing, and bending.

F: 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 and where flying chips or scrap material can strike the head, particularly in the area of the eyes or face. Such hazards are present at the point of operation in cutting wood, metal, and other materials. Examples of mechanisms involving cutting hazards include bandsaws, circular saws, boring and drilling machines, turning machines (lathes), or milling machines.

F: Punching action results when power is applied to a slide (ram) for the purpose of blanking, drawing, or stamping metal or other materials. The danger of this type of action occurs at the point of operation where stock is inserted, held, and withdrawn by hand. Typical machines used for punching operations are power presses and iron workers.

F: Shearing action involves applying power to a slide or knife in order to trim or shear metal or other materials. A hazard occurs at the point of operation where stock is actually inserted, held, and withdrawn. Examples of machines used for shearing operations are mechanically, hydraulically, or pneumatically powered shears.

F: Bending action results when power is applied to a slide in order to draw or stamp metal or other materials. A hazard occurs at the point of operation where stock is inserted, held, and withdrawn. Equipment that uses bending action includes power presses, press brakes, and tubing benders.

(https://www.osha.gov/etools/machine-guarding)

Slide 11: Guarding Methods (3 Minutes)

F: There are multiple methods that can be used to remove hazards that come from coming into contact machinery.

F: Automatic and/or semi-automatic feed and ejection methods do not require the operator to place his or her hands in the danger area. Guards are still required to protect the operator, however, by eliminating the need for operator involvement in the danger area, employees are less likely to be injured.

F: The use of robots can help reduce hazards to workers. These are machines that load and unload stock, assemble parts, transfer objects or perform other tasks. They are most effective in high-production processes which require repeated routines.

F: There are additional aids which can be used to help protect workers such as awareness barriers, protective shields and hand-feeding tools. Generally, these do not provide complete protection and should be used in conjunction with other safety measures. We'll talk more about these aids later in the training.

F: In addition to guards, there are other safeguard devices that can be used to prevent injuries. A safety device may perform one of several functions. It may stop the machine if a hand or any part of the body is inadvertently placed in the danger area; restrain or withdraw the operator's hands from the danger area during operation; require the operator to use both hands-on machine controls, this keeping both hands and body out of danger; or provide a barrier which is synchronized with the operating cycle of the machine in order to prevent entry to the danger area during the hazardous part of the cycle.

Slide 12: Types of Guards (2 Minutes)

F: Let's talk about some of the different types of guards:

- Fixed guards are permanent parts of the machine. These are the most preferred to all other types of guards.
- When an interlocked guard is opened or removed, the tripping mechanism and/or power automatically shuts off or disengages, and the machine cannot cycle or be started until the guard is back in place. An interlocked guard may use electrical, mechanical, hydraulic, or pneumatic power or any combination of these. Interlocks should not prevent "inching" by remote control, if required. Replacing the guard should not automatically restart the machine.
- Adjustable guards provide a barrier which can be adjusted to facilitate a variety of production operations.
- Self-adjusting guards provide a barrier which moves according to the size of the stock entering the danger area. Self-adjusting guards help avoid the potential for human error associated with adjustable guards.

Slide 13: Types of Safeguarding Devices (5 Minutes)

F: Now, let's look at some of the other safeguarding devices and how they work.

F: The photoelectric (optical) presence-sensing device uses a system of light sources and controls which can interrupt the machine's operating cycle. If the light field is broken, the machine stops and will not cycle.

F: The radiofrequency (capacitance) presence-sending device uses a radio beam that is part of the machine control circuit. When the capacitance field is broken, the machine will stop or will not activate.

F: The electromechanical sensing device has a probe or contact bar which descends to a predetermined distance when the operator initiates the machine cycle. If there is an obstruction preventing it from descending its full predetermined distance, the control circuit does not actuate the machine cycle.

F: Pullback devices utilize a series of cables attached to the operator's hands, wrists, and/or arms. This type of device is primarily used on machines with stroking action. When the slide/ram is up between cycles, the operator is allowed access to the point of operation. When the slide/ram begins to cycle by starting its descent, a mechanical linkage automatically assures withdrawal of the hands from the point of operation.

F: The restraint (hold-back) device utilizes cables or straps that are attached to the operator's hands and a fixed point. The cables or straps must be adjusted to let the operator's hands travel within a predetermined safe area. There is no extending or retracting action involved. Consequently, hand-feeding tools are often necessary if the operation involves placing material into the danger area.

F: Safety trip controls provide a quick means for deactivating the machine in an emergency situation. A pressure-sensitive body bar, when depressed, will deactivate the machine.

F: The two-hand control requires constant, concurrent pressure by the operator to activate the machine. This kind of control requires a part-revolution clutch, brake, and a brake monitor if used on a power press.

F: The two-hand trip requires concurrent application of both the operator's control buttons to activate the machine cycle, after which the hands are free.

F: The gate is a moveable barrier that protects the operator at the point of operation before the machine cycle can be started.

(https://www.osha.gov/etools/machine-guarding/introduction/devices)

Slide 14: Machine Guarding Requirements (3 Minutes)

F: In order to keep employees safe, hazardous machinery and tools must be affixed with guarding.

F: Safeguards must meet these minimum general requirements:

- The safeguard must prevent hands, arms, and any other part of a worker's body from making contact with 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.
- Workers 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 safety devices should be made of durable material that will withstand the conditions of normal use. They must firmly be secured to the machine.
- The safeguard should ensure that no objects can fall into moving parts. A small tool which is dropped into a cycling machine could easily become a projectile that could strike and injure someone.
- A safeguard defeats its own purpose if it creates a hazard of its own such as a shear point, a jagged edge, or an unfinished surface which can cause a laceration. The edges of guards. for instance, should be rolled or bolted in such a way that they eliminate sharp edges.
- Any safeguard which impedes a worker from performing the job quickly and comfortably might soon be overridden or disregarded. Proper safeguarding can actually enhance efficiency as it can relieve the worker's apprehensions about injury.
- If possible, one 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 worker to enter the hazardous area.

Slide 15: Guard Construction (3 Minutes)

F: Today, many builders of single-purpose machines provide point-of-operation and power transmission safeguards as standard equipment. However, not all machines in use have built-in safeguards provided by the manufacturer.

F: Guards designed and installed by the builder offer two main advantages:

- They usually conform to the design and function of the machine.
- They can be designed to strengthen the machine in some way or to serve some additional functional purposes.

F: User-built guards are sometimes necessary for a variety of reasons. The advantages of these are:

- Often, with older machinery, they are the only practical safeguarding solution.
- They may be the only choice for mechanical power transmission apparatus in older plants, where machinery is not powered by individual motor drives.
- They permit options for point-of-operation safeguards when skilled personnel design and make them.
- They can be designed and built to fit unique and even changing situations.
- They can be installed on individual dies and feeding mechanisms.
- Design and installation of machine safeguards by plant personnel can help to promote safety consciousness in the workplace.

F: There are disadvantages to user-built guards. These could be:

- User-built guards may not conform well to the configuration and function of the machine.
- There is a risk that user-built guards may be poorly designed or built.

(https://www.osha.gov/etools/machine-guarding/introduction/safety-considerations)

Slide 16: Machines Requiring Guards (1 Minute)

F: The following is a list of machines that usually require point of operation guarding:

- Guillotine cutters
- Shears

- Alligator shears
- Power presses
- Milling machines
- Power saws
- Jointers
- Portable power tools
- Forming rolls and calenders

Slide 17: Miscellaneous/Additional Aids (1 Minute)

F: As mentioned previously, in addition to guarding and personal protective equipment, there are additional aids that can be used to reduce injuries caused by machine hazards. While these aids do not give complete protection from machine hazards, they may provide the operator with an extra margin of safety. Sound judgment is needed in their application and usage.

F: Examples of possible application include the following:

- An awareness barrier serves as a reminder to a person that he or she is approaching the danger area. Although the barrier does not physically prevent a person from entering the danger area, it calls attention to it. For an employee to enter the danger area, an overt act must take place, that is, the employee must either reach or step over, under or through the barrier. Generally, awareness barriers are not considered adequate when continual exposure to the hazard exists.
- Special hand tools may be used to place or remove stock, particularly from or into the point of operation of a machine. A typical use would be for reaching into the danger area of a press or press brake. A push stick or block may be used when feeding stock into a saw blade. When it becomes necessary for hands to be in close proximity to the blade, the push stick or block may provide a few inches of safety and prevent a severe injury.

Slide 18: Don’t Touch the Guards! (2:26 Minute)

VIDEO – 2:26 Min

(Click play to play clip)

Slide 19: Machinery Maintenance and Repair (2 Minutes)

F: Good maintenance and repair procedures contribute significantly to the safety of the maintenance crew as well as that of machine operators. The variety and complexity of machines

to be serviced, the hazards associated with their power sources, the special dangers that may be present during machine breakdown, and the severe time constraints often placed on maintenance personnel all make safe maintenance and repair work difficult.

F: The employer must establish an energy control program consisting of energy control procedures, employee training, and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment, the machine or equipment is isolated from the energy source and rendered inoperative.

F: If possible, machine design should permit routine lubrication and adjustment without removal of safeguards. But when safeguards must be removed, and the machine serviced, the lockout procedure of 29 CFR 1910.147 must be adhered to. The maintenance and repair crew must never fail to replace the guards before the job is considered finished and the machine released from lockout.

(https://www.osha.gov/etools/machine-guarding/introduction/safety-considerations)

Slide 20: One Team

F: Questions?