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JANUARY 2016

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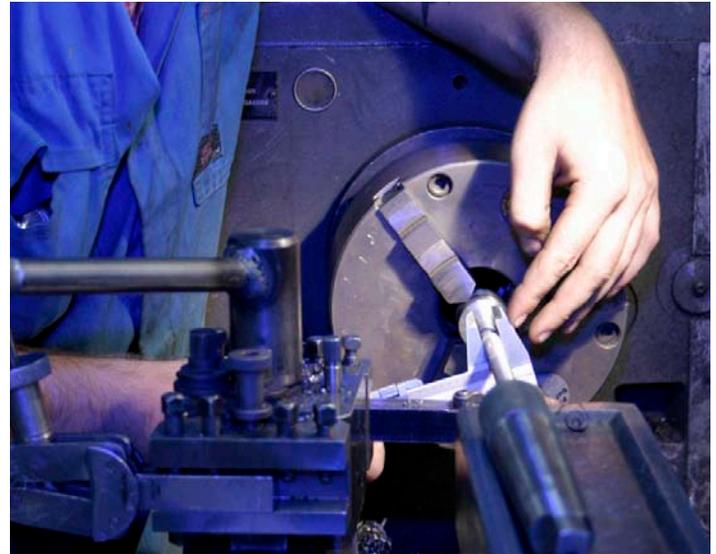
The Roles, Responsibilities & Accountability of Machine Guarding

By Adam Haroz

Each year, more than 200,000 U.S. workers suffer cuts, lacerations and amputations from operating machinery. To reduce the number of worker injuries, OSHA has become more strict, both with regulations and enforcement, on machine guarding violations. Incident investigations indicate that machines lacking adequate safety mechanisms, such as guards and safety switches, have higher risk of injuries. The agency is now targeting industries with higher risk potential. Despite this, a large cultural gap still exists between employers and original equipment manufacturers (OEMs) regarding who is responsible for ensuring that machinery is guarded in compliance with OSHA regulations. This article explores this gap, sheds light on internal inspections by OEMs and end users, and discusses ways to identify and abate guarding problems.

What Is Machine Guarding?

Machine guarding is used as a precautionary safety feature on machinery and other equipment. It acts as a shield to protect body parts from incidental contact with hazardous areas of a machine and can also prevent hazards such as debris and noise from exiting the machine. A guard controls the interaction between the operator and the machine and can be a significant factor in optimizing a machine's performance. Photos 1 through 4 (p. 2) provide



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examples of guarding solutions that have been used in various industries.

Despite countless examples of facility personnel constructing magnificent safeguards, machine guarding remains one of the most-cited regulations during OSHA inspections, and it is one of the top causes of occupational injury in the U.S.

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Machine Guarding Regulations & Responsibilities

Reducing risks in the workplace requires understanding machine safety standards. Although the requirements for machine and employee safety may seem endless, there are ways to ensure proper safeguarding for employees. According to OSHA (2007)

regulations, one or more methods of machine guarding must be provided to protect the operator and nearby employees from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks. OSHA also states that employers are responsible for providing a safe and healthful workplace for employees. Any gap in machine guarding and overall safety on a piece of equipment falls on the shoulders of the employer.

OSHA relies on national consensus standards for some of its regulations. In this case, OSHA follows ANSI's standard on machine safety. ANSI B11.19-2010, Performance Criteria for Safeguarding, provides guidance on the design, construction, installation, operation and maintenance of the guarding systems used to protect employees from potential machine hazards.

Despite understanding what is expected of machine guarding equipment and what regulations serve as the guidelines for safeguarding practices, the most challenging aspect of machine guarding is understanding that the same machine could pose different hazards and require different guarding depending on its placement within a facility and how and where in the process the equipment is used.

According to ANSI, the OEM and the end user must conduct a risk assessment to determine the safeguarding that is required for the equipment. However, it is impractical to expect a machine designer to foresee all potential hazards associated with equipment setup, operation, maintenance and placement within a facility. Therefore, the end user should conduct a risk assessment separate from that of the OEM as a part of due diligence for recognizing and reducing risk. The end user is the most knowledgeable party for interpreting how the equipment will be used, where it will be stored and where the operators will be in contact with potential hazards based on the process the equipment is involved in.

According to OSHA's General Duty Clause, employers have an obligation to protect workers from serious and recognized workplace hazards even where there is no standard. Employers must take action to eliminate all known hazards. For this reason, it is not standard practice for OSHA to inspect a machine prior to setup in the end user's facility. Instead, an OSHA inspector will inspect the equipment being used for the manufacturing process, work practices within the organization and the facility. Practically all OSHA enforcement for machine safety is focused on the end user, since they typically have employees at the point of operation where hazards could exist.

There is some responsibility on the side of the OEM, however. While the OEM is typically unsure of the final location and process staging that the employer has designated for the equipment, the OEM should consider any foreseeable use and misuse of the equipment, as well



Photo 1: Potential pinch-point hazards from exposed chains on a lumber transfer deck.



Photo 2: A guarding solution that is hinged for maintenance access and covers the exposed hazard points.



Photo 3: A potential pinch-point hazard from an exposed conveyor belt.



Photo 4: A guarding solution that is hinged for maintenance access and covers the exposed hazard point.

as the potential point-of-operation hazards for those who may come in contact with the equipment. Also, the OEM's risk assessment should be provided with all new equipment similar to the way a safety data sheet is provided with chemicals. That will allow the end user to examine to what depth the potential risks and hazards were identified and mitigated by the OEM, as well as what gaps are present.

What Makes Machine Guarding So Difficult?

Despite OEMs becoming increasingly aware of the importance of machine guarding, whether it be from a productivity, safety, compliance or even aesthetic standpoint, machine guarding continues to place on OSHA's top 10 most frequently cited standards (OSHA, 2015). This ranking demonstrates that confusion still exists on what is required to properly safeguard equipment, who is responsible for guarding and how a facility can comply with guarding requirements while maintaining efficient productivity and employee safety. Four main factors contribute to this confusion.

1) Multiple Functions

Machine guarding often relies heavily on safeguards to perform multiple functions. These safeguards are expected to do more than simply prevent contact with moving parts. They are also expected to be easily

removed and secured for maintenance, to protect the equipment itself from falling objects or other moving equipment, and to not create additional hazards. Of course, another significant goal is that safeguards do not prevent an operator from performing his/her job efficiently and effectively.

2) Failure to Assess Risk

As stated in ANSI B11.0-2010, Safety of Machinery: General Requirements and Risk Assessment, Section 4.6:

The supplier shall provide safeguarding as determined in the supplier risk assessment and the appropriate machine-specific standard. The user shall ensure that additional safeguarding is provided and installed as determined in the user risk assessment. (ANSI, 2010)

In many cases, employers fail to perform a proper risk assessment because the equipment is believed to be properly guarded by OEMs, or the employer does not possess the expertise to conduct a proper risk assessment to ensure safety and compliance. Conducting a risk assessment of new equipment is not only required, it is a great method of due diligence for determining the risks present for that piece of equipment as well as for that section of the process. Guards are designed and installed to protect against identified hazards.

If an employer is unsure about the risk assessment process or the risk assessment itself, a few options are available. The employer can contact a third party or consultant to come on site and conduct a risk assessment in accordance with the standards, the employer can have the maintenance staff or other employees conduct a risk assessment, or the employer can contact OSHA's compliance assistance specialists. Whichever method is chosen, it is a good practice to obtain and review the OEM's risk assessment and maintain it with the records for that equipment. This document should be made available upon request.

3) Misleading OEM Labels

Along with the intricate principles of machine safety, employers can sometimes be misled by OEMs and/or machine sales representatives. Some OEMs and machine sales representatives misuse phrases such as *OSHA compliant* or *meets all OSHA requirements* to sell equipment to employers, who may not know any better. OSHA does not certify equipment to be compliant.

Equipment that claims to be OSHA compliant, should be checked for any previous risk assessments or any UL and/or NIOSH stamps. These markings will help indicate that the equipment has at least undergone a safety inspection by a reliable agency. End users should also consider that regulations vary between different coun-



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tries, and any equipment that is constructed outside of the U.S. should be purchased with caution and a separate risk assessment should be conducted.

4) Cost & Difficulty of Solutions

Any identified risk should be mitigated to ensure a safe workplace. If hazards are present and identified but not mitigated, abated or somehow guarded due to difficulty of guarding applications or because it is simply too expensive, they could be considered willful violations by OSHA and any associated fines could increase exponentially.

Solutions

Solutions to the problems discussed in this article are not simple. The knowledge, ability and confidence to perform a risk assessment on equipment is by no means easy. Keeping in mind equipment risks as well as the possibility for employee mistakes, the potential for serious injury is always present. For these reasons it can be beneficial to employ a third-party specialist.

Specialists include machine designers, maintenance personnel, consultants and OSHA compliance assistance specialists. While a third-party specialist will cost more up front, machine guarding specialists and safety consultants can often find several potential violations and hazards from inadequate machine safeguarding techniques, standards and practices that maintenance personnel may overlook. Consultants are particularly good at looking beyond OSHA standards. They have the ability to use their knowledge of other applicable consensus standards as well as their experience working with both government agencies and other industries. Consultants and other specialists hired by a facility can explore equipment and guarding's applicability for that specific facility's needs.

The risk assessment itself, while beneficial from a safety standpoint, is also a viable method for vetting the OEM that the equipment was purchased from. While it is pretty clear that conducting risk assessments and obtaining OEM risk assessments will help identify potential risks involved in the operation of said equipment, there is still the possibility that the OEM was misleading in labeling a piece of equipment as OSHA compliant. An internal risk assessment present this problem as the assessment will point out whether the equipment meets OSHA requirements and will reveal any gaps in machine guarding. Any possible gaps in safeguarding should be compared to the risk assessment conducted by the OEM, as there will always be items that the OEM cannot foresee prior to the installation of the equipment.

The costs, the difficulty of the safeguarding solutions themselves, the functionality of the safeguards in relation to the equipment, and the operator are all difficult for a third-party specialist or even a corporate representative to fully comprehend. In evaluating a piece of equipment's guarding requirements, a facility must not overlook is the experience of employees and staff. A facility's employees have hands-on understanding of the equipment and the process, and they are often aware of potential hazards on the equipment that they see and use daily. Getting input from those who operate the equipment (who also may be constructing and even bypassing safeguards) is vital when implementing guarding solutions in a feasible way. This can also ensure that guarding solutions being implemented are safe, and easy to operate and replace, and that as much common sense as possible went into the design and placement of the safeguard.

Conclusion

A paradigm shift is needed in the safety culture from concept to construction. OEMs should consider all possible hazards while the equipment is operational and include any feasible guards on the equipment as an original concept in the design. Employers that purchase equipment should review risk assessments that were conducted and review potential hazards with the OEM. Since the OEM can only plan for so many potential hazards, the responsibility for the final guarding solutions falls on the employer. Once the employer has reviewed the OEM's risk assessment, it should conduct an alternative risk assessment with the knowledge of the placement of the equipment and the location of the operators. With these actions of due diligence, further evolution of machine safety is within reach.

It is everyone's responsibility to change the culture of safety and look at it not just as a means to prevent costly incidents and citations, but as an opportunity to employ the safest solution at every stage of the design and implementation processes. While productivity and efficiency are important, the most vital part of any facility is the safety and well-being of its employees. ■

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