Machine Safety: What is a Risk Assessment and Why is It Important?
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Machine Safety

What is a Risk Assessment and Why is It Important?

A risk assessment is used in machine safety to identify, document, eliminate or reduce hazards in a particular machine or process. While it is always best to refer to the standards when planning a risk assessment, here are a few answers to some commonly asked questions. Note that this article is for educational purposes only and is accurate as of the time of publication. Banner recommends consulting a safety professional about your specific application before implementing safety measures.

Common Questions Answered

**Q: What is a risk assessment?**

Ultimately a risk assessment is a process which helps identify:

1. Potential hazards
2. Potential severity of hazards
3. Frequency of exposure to hazards
4. Strategies to implement to minimize hazards and avoid harm

This process is not a quick cure to all safety issues, nor is it a guarantee of a 100% injury-free workplace. It is more of a risk diagnosis and safety prescription used to document risk in a workplace, help determine an acceptable level of risk, and determine a course of action to mitigate risks.

**Q: What steps must be taken in a risk assessment?**

The fundamental steps in the risk assessment process include:

1. Identifying tasks and the associated hazards in the workplace
2. Assessing the probability and severity of harm
3. Reducing the risk of harm through the elimination of the hazard or through the use of safeguarding methods
4. Documenting the process and the results.

Through the risk assessment process and the documentation it produces, a machine manufacturer and an employer can prove due diligence in providing a safe work place and a quality product.

**Q: What standards should be followed?**

There are many standards! Among them:

- ANSI/RIA R15.06 - 1999, Safety Requirements for Industrial Robots and Robot Systems
- ANSI B11 TR3, Risk Assessment and Risk Reduction
- ISO 14121(EN 1050), Principles of Risk Assessment
- OSHA 3071 Job Hazard Analysis
- IEC 812 FMEA

Also refer to EN 1050 and ISO 13849-1 which outline the process of risk assessment and specific categories of safety
equipment. Standards help define a cohesive strategy or approach to the risk assessment process, which, if followed, can lead to better decisions and more efficient utilization of resources.

Q: Does OSHA endorse any certain standard?
OSHA (Occupational Safety and Health Administration) does not provide a prescription, but it does provide the objective. It is a general expectation that industry-recognized abatement methods will be applied whenever and wherever feasible.

Q: Who is responsible for conducting a risk assessment?
In the US, ANSI (American National Standards Institute) standards that define Risk Assessment, such as B100.0 2010 as well as RIA 15.06 2012, require that both the machine supplier and the user have responsibilities towards ensuring safety. OSHA strongly recommends that a risk assessment be conducted and that it should include the implementation of a plan for risk mitigation and that the entire process should be thoroughly documented to demonstrate due diligence. In the EU, the machine supplier is primarily responsible for ensuring that a safe machine is shipped. They will typically be the ones who conduct the basic risk assessment.

Q: Who should be involved in the risk assessment process?
Choose a diverse and well-respected group of individuals. Operators, maintenance, electrical, mechanical engineers, shift leads, production supervisors, and health and safety professionals are all potential candidates. These individuals should be empowered by an officer of the company who has the responsibility of allocating resources. Management must provide visible leadership to make this process credible.

Q: Can a consultant be hired to carry out a risk assessment?
Competent consultants can greatly enhance the risk assessment process, but the final responsibility for personnel safety is still that of the employer. Employees should also be trained to recognize hazards and act appropriately.

Q: When should a risk assessment be conducted?
Ideally a risk assessment should be conducted whenever changes are made, especially when new machinery or systems are introduced, new tasks are added or a new routine is devised. When adding new processes, evaluate what tasks may create the probability of a hazardous event.

Q: What needs to be assessed?
Everything should be assessed, not just the potential hazards. Look at the work environment, ergonomics, noise, etc. Keep all that in mind, in case of a violation or litigation, one must be able to demonstrate that the risk assessment was sufficient for the given hazard.

Q: How should this process begin?
The first thing that should be done is to get buy-in from front-line employees by explaining that the goal of a risk assessment is to have a workplace free of hazards. It should be emphasized that each employee is responsible for his/her own safety. It is a responsibility of the employee to report any recognized hazards.

Q: What can be done to reduce the risk of injury on hard-to-guard hazardous machines?
Do what is feasible from a design standpoint. Implement safeguards, use personal protective equipment, raise the general level of awareness of the hazard, and develop safe work procedures for all tasks where the hazard cannot be eliminated or controlled. The end result should be to achieve a tolerable level of risk.
Q: How should risks be prioritized?
Priority should always be given to the highest risk hazard. An ergonomic work station is less of a priority than an unguarded stamp press.

Q: How do you determine which hazards are worse than others?
Industry risk assessment models are designed to assist with this process.

Q: What industries use risk assessments?
Risk assessments are conducted in many different industries where workplace accidents must be minimized and where product quality and performance are critical. Some of these industries have made an effort to standardize a process for evaluating risk, including:

- Metal forming/cutting
- Medical devices
- Robotics
- Insurance
- Aerospace
- Semiconductor
- Transportation

Q: Do small companies need to record the results of a risk assessment?
Yes, it is strongly recommended that all companies, regardless of size, thoroughly document any risk assessments that they conduct. If a safety-related incident should happen to occur, this documentation can be used to demonstrate that a risk assessment was done properly and that all necessary risk mitigation strategies were put into place.

Q: Do OEMs need to perform a risk assessment?
Yes. It is a minimum responsibility to consider risk associated with all reasonably foreseeable use and/or misuse of equipment and to design out or minimize these risks where feasible. OEMs have a duty to their customers to make them aware of any residual risk associated with the operation of equipment. The end-user should reduce any further identified risk through additional safeguards and administrative measures including supervision, warning signs, and training.

Q: How can the accuracy of a risk assessment be verified?
Generally, a risk assessment can be considered accurate if it can be demonstrated that all the minimum requirements established by an industry have been met or exceeded and that results are periodically reviewed and confirmed.

Q: How can one be certain of compliance with standards in other countries?
Most countries have adopted ISO (International Organization for Standardization) standards. If you have conducted a good risk assessment, it will satisfy standards in most countries.

Q: Where does a risk assessment fit into the safety program?
A risk assessment is listed in OSHA’s proposed safety program rule as the second of the five core elements of a safety program. It immediately follows management leadership and employee participation.
Q: **What is an FMEA?**
A Failure Mode and Effect Analysis (FMEA) is one specific procedure used to conduct a risk analysis. When identifying hazards, it is sometimes necessary to look systematically at the components that control the hazard or protect people from the hazard. Valves slow down, brakes wear out, mechanical door switches can fail, etc. If components are relied upon for safety, the failure modes and their effect on safety must be analyzed.

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