Machine Safety: Design a safer machine or improve an existing machine with risk assessments

The key to improving machine safety is to know how to conduct a risk assessment on the machine in order to understand how the machine operates and how workers interact with the machine. Any identified risks, whether mechanical or controls or operations related, can then be addressed to increase safety while maintaining or improving productivity. Several reasons for carrying out risk assessments, and the typical steps for conducting a risk assessment are described below.

Reasons to conduct risk assessments

1. It is good business practice – reduced worker injuries equates to reduced costs.

2. Due diligence responsibility – you must take every precaution reasonable to protect your workers.

3. New/modified machine can be put into service immediately upon arrival - risk assessments conducted for a new machine or process before equipment is ordered or modified ensures that equipment is assembled with guarding and controls that will meet the safety requirements when it arrives on your plant floor with little to no chance that guarding and controls will be found to be unacceptable and have to be removed and replaced at additional costs and time delays.

4. Your business safety culture – improving safety culture improves worker morale and job satisfaction and worker retention.

5. Industry machine safety standards require risk assessments to identify issues and provide logical and practical solutions to mitigate the risks.

6. Risk assessments provide an opportunity for operators and maintenance personnel who will be working with equipment to provide input from their point of view which may not be obvious to managers – workers who have participated in the risk assessment understand the risks and take ownership (buy-in) in the final equipment guarding and controls that they will be working with.

7. Risk assessments and their results provide valuable information which can be used to help with Operator and Maintenance Standard Operating Procedures, Lockout/ Tagout Procedures, Job Safety Analysis, etc.

You may have additional reasons to add to the above list.

In reviewing the above list, does it not make sense that manufacturers (industrial establishments) would automatically be conducting risk assessments as part of their safety review?

The old approach of “this is how we have always done it” or “we’ve never had an injury” is what we often hear in the workplace, however, these arguments will not protect you in court if there is an injury to your workers. The lack of previous injuries may have been simple luck, and not actually having a safe workplace.

Companies that are pro-active in reducing the potential for injury to their workers incorporate risk assessments into their business plans because they have recognized that there is a cost saving associated with not having injured workers and costs associated with injuries (salary and rehabilitation costs, replacement worker costs, lost productivity costs, Ministry of Labour fines, etc.). These costs are usually much greater than the costs of risk assessments and proper machine safety design.

How to conduct a risk assessment

A risk assessment requires the evaluation of a machine/process in a systematic way and is most effective if the review team includes members who are familiar with operations and maintenance. Suggested steps include the following:

1. Prepare and research limits of the assessment [prepare scope, select team members, accumulate materials to be reviewed (drawings, manuals, etc.), approvals received, referenced standards]

2. Identify all tasks and hazards [identify all persons who could be working on or near the machine, what they would be doing, what procedures and training they have, etc.]

3. Assess initial risk(s) [visualize machine with no guards to determine hazards and consider severity of potential injury, frequency of exposure, ability to avoid the risk]

4. Risk reduction actions [review risks with the guarding and controls provided with the machine]

5. Assess residual risk(s) [do provided guards and controls eliminate the risk or merely reduce it?]

6. Acceptability of residual risk(s) [if risk is not eliminated, is remaining risk acceptable, or is further reduction of the risk required?]

7. Validate solution(s) [determine residual risks that are acceptable. Suggest machine be reviewed after identified remedial measures (i.e. additional guards or controls or other methods) are implemented]

8. Provide documentation [provide report or spreadsheet documenting the risk assessment process outlined in the steps above and file with machine file, health and safety department, etc.].

The first few risk assessments a company does will be time consuming as the process and sequence are determined to systematically identify and evaluate hazards associated with a machine. Once all hazards are identified, measures to mitigate those hazards can be identified and implemented to make the machine safer. With practice, and with the correct evaluation team members, the time to carry out risk assessments will decrease and the risk assessment will become a normal part of the safety review for new and/or updated equipment.

SESI invites you to visit www.safeworkengineering.com for information on services we provide, or to contact SESI at contact@safeworkengineering.com.

If you have any current or future machine safety review applications you would like to discuss in general or if immediate assistance is required, please contact Peter Michels, P. Eng. or Chris Ellis, P. Eng. at our office at Tel. No.: 519-725-5555.