



Suffering from a False Perception Safety?

We make snap decisions everyday that have a huge impact on our personal safety. When we drive a car, ride an escalator, or operate a piece of equipment, we repeatedly put ourselves at risk. Structure is often added to protect us, (guard rails, anti-lock brakes, or machine controls) but we are ultimately responsible for ourselves. These judgment calls are a process of evaluating the danger (risk), possible exposure to it (remote or likely) and the severity of injury. From these “risk assessments” we decide how we should proceed. What happens when these safeguards are not what we really think they are?

In the North American industrial setting, the lack of proper application and understanding, or worse, the ignoring of the issues at hand, is a very real problem in many manufacturing settings. As is true in every instance in life, when an individual sees a hazard, they take care to protect themselves. Accidents only happen when aspects of the risk exist that they don't understand, or when they forget. In the work place setting, it has become the norm to take steps to protect the operator or maintenance technician. When steps are taken for proper guarding or controls, the personnel around the machine begin to rely on the devices installed and no longer maintain a cautious attitude. Is this trust in the machine correctly placed? Guarding and controls should only be viewed as additional protection for the worker and not the end all. Responsibility still remains at the individual.

In today's environment, there are many who would argue with this concept of sole- personal responsibility – and correctly so. Machinery is often complicated with various sources of potential harm. Manufacturer's mission and vision statements profess their pledge to provide a safe work environment for their workers. They also put in safeguards or controls which often double as protection for large capital equipment. Government agencies, such as OSHA (Occupational Safety and Health Administration) also require that certain minimum safeguards are in place protecting individual from harm. Therefore, this requires the designers, installers, and users of these safeguards to do so properly.

The machine designer is the first then to insure that the safety system design is correct. This includes, but is not limited to, not allowing for faults, methods of bypass, and that forms of stored energy are accounted for with a controlled means of dissipation. The challenges are multiplied when considering emergency stop, mid-cycle stop, or incomplete part considerations and the restarting after one of these scenarios.

The machine user is responsible to understand these provisions and use them correctly. This seems straight forward. But then why do accidents happen?



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Accidents happen when 1) Designs and their applications are insufficient. 2) Operators or maintenance personnel do not view the safeguards as useful, but a hindrance and find ways to defeat them. 3) When equipment is old or pieced together from various sources, undergone updates, and has not had a comprehensive assessment of its risks performed.

Accident causes #2 and 3, listed above, are often permitted due to internal issues within an organization. People are unaware, don't care, or make the decision not to deal with the issue now, ever, or until forced to. This is sadly the cause of many unfortunate accidents.

Accident cause # 1 listed above – improper design and execution, can be further broken down and defined. ANSI B11-TR-3 (American National Standards Institute) is a trade report that has given guidelines as to how system design is to be executed. This TR-3 has become the basis for OSHA 29 CFR 1900.1 which is the new standard for risk assessments. The guidelines include the logical flow, in order of importance, of reducing risk by 1) designing out the potential hazard, 2) guarding out the hazard, 3) controlling out the hazard by properly utilizing safety rated safeguards, 4) using policies and training to reduce the hazard.

Two significant changes that this TR-3 requires are that a risk assessment be performed and documented on all new and rebuilt machines. (It is unclear at this time when this will be required for all equipment on the shop floor.) Both the machine builder and the user are responsible for performing the assessment. (This is best performed by a combined risk assessment team.) Historically, it has only been the user / owner that have been held responsible for safety.

Designing out and guarding out hazards is usually easier to understand, but not always easy to accomplish.

Controlling out hazards become more difficult and allow much more room for a false feeling of safety. Often in machinery, other sources of power exist – such as pneumatic, hydraulic, vacuum, or energy stored in flywheels and counterbalance weights. Therefore, the control circuit integrity influences much more than just the electrical circuitry. It plays into the choice of the components that the electrical signals are controlling. The electrical codes have broken down electrical circuits and components into categories. B, 1, 2, 3, 4. New equipment is being designed and produced in the pneumatic and hydraulic markets to mirror the control options already available in the electrical markets. Proper



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selection and application of these new products can ensure that your controls systems integrity is maintained. Some of the key buzz words include redundancy, monitored systems, and control reliable. The false feeling of safety is found in that light curtains or safety mats, and door interlocks are designed as control reliable. They are used to create a barrier around a hazard. But when they control a non-safety rated / control reliable device, the integrity of the control reliable circuit is broken. Electrically they may have a good solution, but in total they are only as safe as the weakest link. Some may argue that it is better than nothing. But is it?

In today's environs, is being "OSHA compliant" satisfactory? As developments occur, a time lag occurs before OSHA has the opportunity to update their standards. As a result, the underlying message they convey is that you are to utilize the "best known safety practice".

We must remember that our human tendency is to see a machine with guarding and controls as "safe". Our comfort level or safe feelings often increase as we spend more time around the equipment. It is the designers and installers responsibility under ANSI B11.19-2003 to provide a safe system. It is our obligation to our workers to provide safety systems that allow them to go home to their families at night un-injured.

What about expense? Is spending added monies to eliminate a rare possibility something we can afford? Answer - What are the true costs of an accident?

How can I begin? Perform risk assessments carefully and err on the high side. Safety can pay back in machine up time, reduced employee absenteeism, saving time and money in the investigation of an accident, insurance saving (often overlooked – with a comprehensive risk assessment in place, you may be able to negotiate lower rates) and other hidden costs involved with accidents.

Safety is an integral part of a company's loss prevention program.

* ISO 13849 specifies that the term safety system includes not only the electrical portion but "The combined safety-related parts of a control system start at the point where the safety related signals are initiated (including e.g. the actuating cam and roller position switch) and end at the output of the power control elements (including e.g. the main contacts of the contactor). This also includes monitoring systems." This standard then proceeds to define the term SRP/CS (Safety Related Parts of the Control System) to include light barriers, switches, relays, hydraulic valves, pneumatic valves and all other components in the chain of the system.