



Loss Control TIPS

Technical Information Paper Series

Innovative Safety and Health SolutionsSM

Machine Safeguarding and Product Development

Introduction

Have you ever seen a new piece of manufacturing equipment, or a line, and noticed machine safeguarding exposures? Did you wonder why a manufacturer would ever make the equipment that way (i.e., with a safeguarding hazard)? Part of the answer lies in the system engineering methods that occurred in the product development process.

What can be done to improve compliance when developing equipment? A manufacturer will determine the answer to this question as they move the product through its developmental stages (from concept to market). How can the delivery of non compliant equipment be avoided? The following set of questions will provide essential developmental information for equipment manufacturers.

1) Has a hazard analysis been performed? A hazard analysis will greatly reduce the risk of producing a bad product. It is a question frequently asked by the legal profession in product liability cases. Companies that take the time to perform an early hazard analysis are practicing good system engineering. At a minimum, any manufactured product deserves a preliminary hazard analysis to identify rudimentary concerns.

For simple products, this can be as basic as: conferring among knowledgeable professionals, known precedents (or similar products) research, or safety codes (OSHA, ANSI, etc.) research. More complex equipment should have more detailed examinations such as: failure mode and effects analysis, subsystem/system hazard analysis, or fault tree analysis.

Many types of analysis can be performed. A manufacturer should be interested in the ones that identify potential exposures to the operator. (The same process may also extend to the environment, equipment, or facility.) Performing hazard analysis early on in the development of a product will result in a *design for minimum risk*.

2) Who participated in the analysis? For simple, non energized equipment, few technical resources may be required. The group should be expanded to represent a broad range of disciplines for more complicated equipment. At some point early in the development of the product, professions included in the review could cover: engineers familiar with the energy used or created (see item 3), safety engineers, human factors specialists, occupational health, medical, fire prevention, and legal, and (if possible) potential users.

3) What energy sources are involved in using the product and where are they located?

These usually fall into three categories. They are: (1) required to use/operate the equipment, (2) a result of using the equipment, or (3) likely to affect the equipment. These could include: pneumatic, hydraulic, gravity, pressure, mechanical motion, electrical (including static), radiation (i.e., ionizing, non ionizing, radio), thermal (i.e., heat, cold, sparks), noise and vibration, impact & shock, chemical, biological (microscopic: viral, bacterial, amoebic, fungus, spores, etc.), and environmental (sun, wind, etc.). Any of these could affect how the end user should use or treat the equipment.

4) When hazards have been identified, have they been tracked? Identified hazards must be tracked through the engineering process until they have been remedied for the final product. The resolution (from most preferable to least) could be an engineering change, modified instructions, or signage.

5) What safeguarding strategies for the product have been used to prevent injury to the user or passers-by? For mechanical exposures, these will fall into two general categories: guards and devices. Guards *prevent* access to the exposure and devices *control* access to the exposure. Guards keep operators from physically putting themselves (fingers, limbs, whole body) into a hazard zone. Devices can control access to the equipment (e.g., point of operation, power transmission apparatus). If the operator enters the hazard zone, the equipment shuts down before injury occurs or; it will not turn on as long as the operator is in the exposure area or a safeguard is reestablished. Safeguarding by a set of user's manual instructions (perhaps even a video may be appropriate) and signage should be included though engineering controls will provide the most definitive strategy.

6) Has the product been "field" tested? Field testing will uncover many engineering shortfalls. The results of the testing must find their way back to the production group so that production changes can be instituted before the product is made available to the consuming public. All products should have functional use/abuse trials. Trials help validate the safeguard measures in place as well as indicating inadequacies.

7) After the product is marketed, is there an administrative protocol in place to log user reports and provide for modifications and/or recall? Complaints, incidents, or injuries during use of the product must be recorded and resolved. Manufacturer points of contact, addresses, and phone numbers (an 800 number is a good feature) must be supplied to the end user. If engineering changes are required, the information must get to those who can effect an immediate change in production. A manufacturer may also find it necessary to contact other users to correct discovered deficiencies.

Conclusion

By now you realize that this process can highlight many liability exposures. During the system engineering process, exposures other than those involving machine safeguarding will also be identified. In fact, a thorough system engineering process will relieve a multitude of product development concerns. If machine safeguarding exposures are evident when new equipment arrives, one might wonder: what other oversights have been engineered into the new system?

For more information, contact your local Hartford agent or your Hartford Loss Control Consultant. Visit The Hartford's Loss Control web site at <http://www.thehartford.com/corporate/losscontrol/>

This document is provided for information purposes only. It is not intended to be a substitute for individual legal counsel or advice on issues discussed within. Readers seeking resolution of specific legal issues or business concerns related to the captioned topic should consult their attorneys and/or insurance representatives.