

CLM PROFILE

Machine Guards: What Are They, and Who Is Responsible for Them?

By Peter Chen

Since the dawn of the industrial revolution, machines have allowed workers to increase productivity, decrease production errors, improve the quality of produced goods, and, in many ways, improve safety. However, in order to be able to do all of those things, machines by and large require energy and power from primarily mechanical and electrical sources. However, power can also come from pneumatic, hydraulic, or chemical sources.

In today's modern manufacturing or assembly production line, machines are often combined into flow lines or work cells. The machines are sometimes operated as individual machines, but many times may be integrated into an entire system of machines.

Unlike lockout/tagout, which is intended to control hazardous energy during maintenance, repair, or inspection of a machine, "machine guarding" is the engineered control of hazardous energy during the normal operation of a machine. A machine, process, or device may contain a variety of forms of hazardous energy including:

- Electrical energy.
- Pneumatic or hydraulic pressure, typically stored in pressurized systems or vessels.
- Mechanical energy (i.e. point of operation, pinch points, rotating parts, sharp chips).
- Thermal energy.
- Chemical energy.
- Power transmission (mechanical, electrical, etc.).

Machine guards not only attempt to prevent contact between the operator and hazardous energy during production, but also attempt to protect operators from the by-products of production (chips, sharp objects, etc.). Machine guards may also protect operators from falling

or other objects that could come from above or from around the operator during normal production.

Evaluation of machine guarding has to take place not only at individual machines within a process, but also along machines and processes that are integrated and/or automated. Evaluation of machine guarding also has to take into account not only the operator assigned to work at a particular machine or station in the flow line, but also for other workers who could be within the areas of production operation.

Engineered elements of machine guarding may include some or all of the following:

- A fixed barrier between the operator and moving parts of the machine.
- Guarding by height or by location.
- An interlocked barrier that disables and stops the machine when the barrier is opened during normal operating processes.
- Emergency stops, operator machine control stops, and operation key stops.
- Pressure-sensing pads that require the operator to be at a certain station before the machine will operate.
- Laser or light barrier curtains that disable a machine if an object crosses a certain plane or region.
- Adjustable and/or mobile guards that accommodate a variety of processes.
- Function-enabled switches that require operators to be at a certain station before the machine can be enabled and operated.

For those operators who must be exposed to hazardous energy during the normal production process, per OSHA 1910.147, the engineering and administrative methods (or equivalent) for lockout/tagout of a machine may also become part of the normal production process for a machine in the event operators or indirectly

exposed employees have to remove or bypass normal protective devices as a regular part of the production process. Furthermore, for operators who have to work at or about a point of operation, there may be additional engineering and administrative controls for safety.

Ideally, the machine guards should be designed so they don't create additional hazards for operators or create an impediment during production. Ideally the machine guards should be designed to be tamper resistant or tamper proof.

Facilities should also consider additional administrative controls (rules, regulations, training, etc.) to prevent operators from having access to tools or equipment (ladders, aerial lifts) during production operation whereby guards can be thwarted or bypassed. Tools and equipment normally used for maintenance activity for the machines should be kept away and out of access during normal operations.

The question is often asked: Who is responsible for machine guarding? The universal answer is: everyone. From the OEM manufacturers of machines, to the designer/installer of machines in a system, to the facility or factory in which the machines are being used, to the operator of the machines, and to the maintainer of the machines, everyone who is involved with a machine or machine system from birth to grave has a role in making sure that the machine is adequately guarded, the guards are being used as designed, the guards are not being bypassed or thwarted, the guards are working as designed, and the guards are maintained as required.

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