

Machine Guarding - Introduction

Power transmission parts are the mechanical components of a piece of equipment that, together with a source of power (sometimes referred to as a prime mover), provide the motion to a part of that machine or equipment. Parts involved in the transmission of power are gears, belts, shafts, chains etc . . . they can grab clothing, cut, nip or strike body parts.



Mechanical Hazards occur at the point of operation, in the power transmission apparatus and any moving part. Hazardous mechanical motions rotating, reciprocating, and transverse.

Here is a good rule of thumb . . . If you can contact the moving parts on a machine, the machine must be guarded.

The point of operation is where the work is actually performed on the material.

In this case the mechanical hazard is represented by the rotating motion of the drill press.

Nip Points - Precautions

In-Running Nip Points



Common nip points on rotating parts



Nip points between rotating elements and parts with longitudinal motion

In-running nip points are frequent sites of injuries from machinery. Nip points exist where material enters a gradually narrowing opening, for example, pulling rolls, and the material is strong enough to pull body parts, such as fingers, hands, arms, and hair, into the pinch point.

Dangerous nip points also occur in machinery parts not in direct contact with the material, such as near pulleys, gears, and spindles—where linear or rotary motion of the moving equipment occurs through narrowing openings between components. Frequently the machine is running too fast, or is too powerful to allow stopping before significant injury occurs.

Dangerous Practices

There are far too many cases in which personnel are exposed to dangerous in-running nip points. These situations particularly are prevalent when the material is hand-fed or personnel are working near the machinery.

It is important for everyone involved in the production or maintenance process to be aware that there are many, many nip points in most operations, and that these nip points present a high injury risk. It is equally important to be aware that the nip points become even more hazardous when the material or machine is not moving smoothly, such as when feeding problems, erratic speeds, misalignments, breakdowns, and other abnormal conditions are present. Under these circumstances, manual intervention to remedy the problem occurs frequently, and during the urgency and stress of resuming production, dangerous work methods may arise inadvertently.

Manhandling the material; using pry bars or other inappropriate tools; making adjustments on the move that should be done when the machine is stopped; reaching for dropped items; and slipping on cluttered or slippery floors all can cause body parts to enter nip points.

Safeguards



SAFEGUARDS

There are many ways to safeguard machinery. There are five basic classes of safeguards:

A guard or barrier ensures you cannot reach the moving parts. A device stops the motion of the machine or apparatus before a worker can come into contact with it, and prevent restart until the operator manually resets the device.

Location places the machine or power transmission apparatus in a locked mechanical room, or more than 7 feet above the work surface, and distance places the hazardous machinery in locked cages, or protects worker with proximity light curtains.

Automatic or semiautomatic stock feeding and ejection methods. Miscellaneous aids, such as push sticks or other tools to place or remove stock.

Fixed guards are permanent part of the machine. They provide the best guard protection. As a general rule, power transmission apparatuses are best protected by fixed guards that enclose the danger area.

Safety trip controls typically rely on the force of the operator leaning against them to trip a microswitch that shuts down the equipment, eliminating the hazard.

A pressure-sensitive body bar is an example
A safety tripod is another example
Others, like the tripwire cable pictured here, are placed around the danger area and are immediately reachable by the operator.

Keeping distance between you and the machinery is about as safe as you can get from exposure to moving machinery parts.

Distance virtually eliminates the risk of injury. This very effective method is limited by the amount of space available in the work area.