Machine Guarding and Maintenance

1. **Identification of Workplace Hazard**

   The exposed moving parts of machinery can cause serious injuries to an employee who is inadvertently caught by the machine. Hazardous moving parts of machines which are called pinch points or nip points and in some cases the actual point of operation of the machine must be guarded to prevent accidents. Typically, all moving parts which are not points of operation must be completely guarded and points of operation guarded in a manner which allows normal operation but protects the operator to the extent practical.

   Guards that are improperly adjusted or missing pose a serious workplace hazard. When guards must be removed to expose moving parts of machines for maintenance cleaning or adjustment, special safety procedures including using remote tools, methods which assume exclusive control and/or a lockout/tagout program must be used.

2. **Management and Trainer Information**

   The employer must provide effective guarding on all machinery which exposes employees to moving part hazards. The following types of machinery must be guarded:

   1. Chains and sprockets;
   2. Gears;
   3. Belts and pulleys;
   4. Revolving or reciprocating parts;
   5. Screw conveyors;
   6. Belt conveyors and head/tail pulleys and drives;
   7. Exposed shafts;
   8. Projecting shaft ends;
   9. Collars and couplings.

   The guards must provide effective protection including totally enclosing the hazardous area and must be checked frequently for proper adjustment.

   Points of operation also must be guarded to prevent employee injury during part inspection or other work activities. Guarding for points of operation is more complicated given the need for the machine to properly function. Cal/OSHA has numerous standards for specific types of equipment listed in the General Safety Orders. In general, point of operation guards include shielding, barriers sized to prevent operator exposure, operating control safeguards like double palm switches and light curtain devices that deactivate equipment when the operator's presence is detected. Cal/OSHA standards, vendors of equipment and experts should be consulted to assure proper point of operation guarding. If a machine or tool is supplied with a guard, it must never be removed or modified.
If maintenance, including cleaning and adjusting machines is necessary, the employer must establish safety rules for how these tasks are safely performed, including the following:

(1) Use of extension tools that preclude employee exposure to moving parts during cleaning, unjamming, lubricating, etc. The employer must provide the tools and train employees in their use.

(2) Assurance of exclusivity of control, if and only if, the machinery must be energized during adjustment, unjamming or other maintenance. The person performing the maintenance must be the only one who can activate the machine and have all controls under personal surveillance during the work. Note: this is a very narrow exception to lockout/tagout and must be carefully implemented.

(3) Lockout/tagout procedures which require that all sources of electrical, mechanical, hydraulic or pneumatic energy are isolated from the machine by physically locking out and applying warning signs or tags. The employer must provide: appropriate locks and tags and establish a written procedure that describes the applicability of the lockout/tagout policy and designates responsible persons; a step-by-step procedure to shut down and apply locking devices and test the effectiveness of de-energization; a logging system to document use of the procedure; an annual self-inspection of its effectiveness; and a requirement for contractors to follow the procedure. Employees must be trained and qualified to use the lockout/tagout procedure.

Through safety training, employees must be made aware of the serious hazards associated with machinery and the employer's procedures to assure their protection.

3. Employee Safe Work Practices

Employees should be required to comply with the following safe work practices with respect to machine guarding and maintenance protection:

**Machine Guarding**

(1) If a guard is on a machine, it should not be remove or bypassed. If misadjusted, it should be reported to your supervisor. Know how guards and other safety devices function and how to inspect them.

(2) Be sure to follow proper operating procedures for your machine. Take no shortcuts in any step-by-step procedure.

(3) Keep hands away from moving machine parts and out of points of operation.

(4) Avoid wearing loose fitting clothing, long hair and jewelry around moving parts of equipment. Gloves also may be inappropriate in such situations.

(5) Adjust shields properly on points of operation if chips or other eye or face hazards are present.

(6) Assure that there are no slipping or tripping hazards around machinery.

(7) Report to your supervisor if your machine makes movements or operates independently of your commands.

(8) Know where all controls for machines in your work area are located and how to shut down the equipment in an emergency.
(9) Do not operate a machine you have not been adequately trained to run. If you have any questions or uncertainties, notify your supervisor.
(10) Notify your supervisor of any problems you discover or any safety hazard on a machine, such as unrecognized pinch points or unguarded part.

**Adjusting, Unjamming and Maintaining Machinery**

(1) If you have been authorized and a special tool is available, carefully use this tool to unjam or enter the hazardous areas of equipment. Do not expose any part of your body to the machinery.

(2) If you have been trained and the employer's procedures allow for exclusive control adjustment of machinery, you may perform this type of maintenance after assuring exclusivity of control. All operators and other personnel must be warned that this procedure is in progress.

(3) Use lockout/tagout for any maintenance activity to isolate energy from the machine. Be sure that all electrical, mechanical, hydraulic and pneumatic energy is locked out and/or blocked. Use the locks and tags provided by your employer. Take no shortcuts in following lockout/tagout procedures.

(4) Keep a record of your lockout/tagout activities on the employer's log.

(5) Be sure to test equipment that has been locked out to make sure it is de-energized.

(6) Do not perform any maintenance on machinery unless you are absolutely confident it has been effectively de-energized.

(7) Use care in re-energizing equipment to assure that all personnel potentially exposed to the machinery are clear and aware that it is being returned to service.

(8) Coordinate with operators and other maintenance personnel and contractors to assure effective locking out of equipment, involving multiple workers.

(9) Report any problems concerning the lockout/tagout procedure or questions you have to your supervisor.

4. **Items Subject to Periodic Inspections**

(1) Are all guards on machines effective, in good repair and properly adjusted?

(2) Are there any moving parts of equipment or machinery needing guards or that employees report as needing guards?

(3) Are all points of operation equipped with guards or other safety devices as required?

(4) Are employees properly using point of operation guards and following required operating procedures.

(5) Are employees in work areas around machinery avoiding long hair, jewelry and loose-fitting clothing which might get caught?

(6) Have employees been properly trained to operate the machinery to which they are assigned?

(7) Are employees using remote tools only to unjam operating equipment?
(8) If maintenance is being conducted, is it being performed in compliance with the employer's lockout/tagout procedures, or exclusive control alternative if applicable and approved?
(9) Is a log of lockout/tagout activities being maintained by maintenance personnel?

(10) Has an audit of the effectiveness of lockout/tagout procedures been conducted within the last 12 months?