

Summary of Changes

to

P 440.1-25A Machine Guarding Program

Revised Version Issued as P 440.1-25B of 7/8/05

NETL Procedure 440.1-25A, Machine Guarding Program, of 6/29/04, has undergone revisions. References have been updated to include OSHA and ISO requirements. Redundant responsibilities have been removed. 29 CFR 1910.213-219 requirements have been added which detail specific machine guarding techniques. Other changes have been made to clarify the Procedure and to reflect actual practice. Please replace NETL Procedure 440.1-25A with NETL Procedure 440.1-25B.

The most recent and official controlled hard copy version of this directive resides with NETL's Directives Coordinator. An electronic version of the controlled directive has been placed on the NETL Intranet for employee use. Printed hard copies of this electronic version are considered noncontrolled documents.

U.S. Department of Energy

National Energy Technology Laboratory

PROCEDURE

P 440.1-25B

ISSUED: 7/8/05

REVIEWED: 7/8/05

SUBJECT: MACHINERY AND MACHINE GUARDING

1. PURPOSE. To insure that appropriate safeguards are installed and maintained on tools, equipment, and machinery operated at NETL.
2. CANCELLATION. This Procedure replaces NETL Procedure 440.1-25A, Machine Guarding Program, of 6/29/04.
3. REFERENCES.
 - a. NETL Procedure 440.1-20, [Lockout/Tagout Program](#).
 - b. NETL Procedure 440.1-26, [Hand/Portable Power Tools](#).
 - c. Statutory ES&H Standards:
 - (1) Occupational Safety and Health Standards, 29 CFR Part 1910, Subpart O.
 - (2) Occupational Safety and Health Standards, 29 CFR Part 1926, Subpart C and I.
 - d. Reference ES&H Standards:
 - (1) ANSI B24.1, Forging Machinery Requirements.
 - (2) ANSI O1.1, Safety Requirements for Woodworking Machinery.
 - (3) BS PD ISO/TR 18569:2004; Safety of Machinery Guideline for the Understanding and Use of Safety of Machinery Standards.
 - (4) ISO 14119, Safety of Machinery - Interlocking Devices Associated with Guards - Principles for Design and Selection.
 - e. References:
 - (1) Machine Guarding Handbook: A Practical Guide to OSHA Compliance and Injury Prevention.

INITIATED BY: Office of Institutional and Business Operations
NO. OF PAGES/ATTACHMENTS: 6 pages

4. DEFINITIONS.

- a. Safeguards (Guards) -- Barriers that prevent access to danger areas. There are four general types of guards:
- (1) Adjustable -- Adjustable guards are used when flexibility is required to accommodate various sizes of stock.
 - (2) Fixed -- A permanent part of the machine and not dependent upon moving parts to perform its intended function. A fixed guard may be constructed of sheet metal, screen, wire cloth, bars, plastic, or any other material that is substantial enough to withstand whatever impact it may receive and to endure prolonged use. This type of guard is usually preferable to all other types because of its relative simplicity and permanence.
 - (3) Interlocked -- When this type of guard is opened or removed, the tripping mechanism and/or power automatically shuts off or disengages, and the machine cannot cycle or be started until the guard is back in place. An interlocked guard may use electrical, mechanical, hydraulic, or pneumatic power or any combination of these. Interlocks should not prevent "inching" by remote control if required. Replacing the guard should not automatically restart the machine. To be effective, all movable guards should be interlocked to prevent occupational hazards.
 - (4) Self-Adjusting -- The openings of these barriers are determined by the movement of the stock. As the operator moves the stock into the danger area, the guard is pushed away, providing an opening which is only large enough to admit the stock. After the stock is removed, the guard returns to the rest position. This guard protects the operator by placing a barrier between the danger area and the operator. These guards may be constructed of plastic, metal, or other substantial material. Self-adjusting guards offer different degrees of protection.

5. QUALITY CONTROL.

- a. Line Managers shall ensure that employees under their supervision have received appropriate training regarding the proper use of machine guarding devices on equipment to be operated prior to operation.
- b. Line Managers shall periodically inspect areas under their supervision during and after the use of machines by their employees to ensure that appropriate operating procedures are being followed.

6. RESPONSIBILITIES.

- a. Line Managers shall have primary responsibility for ensuring that this Procedure is fully implemented by employees under their supervision that includes:

- (1) Ensuring that guarding devices on hand tools and other mechanical and electrical equipment are used and maintained properly.
 - (2) Ensuring that employees are properly trained and qualified in the use of machine guarding devices specific to the tool or equipment to be operated.
 - (3) Ensuring that employees know and follow the manufacturer's operating instructions regarding the proper use of machine guards on electrical/mechanical equipment, power hand tools, etc., to be operated (see also NETL Procedure for Hand/Portable Power Tools).
 - (4) Ensuring that mechanical and electrical safeguards are in place and that employees do not tamper with, remove, or otherwise inactivate machine guards and thereby create a hazard to themselves or others.
 - (5) Ensuring that periodic equipment inspections are performed by qualified employees to determine whether or not machine guarding devices are in proper working condition.
 - (6) Ensuring that all machinery that have appropriate warning or danger signage and that the signage is clear, legible and not damaged, defaced, or removed.
 - (7) Following the maintenance schedules closely to ensure that the machine guarding devices for all the machines under their supervision are in good, operable, and safe conditions.
- b. Environment, Safety, and Health Division Director shall ensure that this Procedure is maintained and updated as appropriate.
 - c. Safety Staff shall inspect NETL facilities and audit work areas for compliance with the requirements of this Procedure.
 - d. NETL Site-Support Contractors shall fully implement the requirements of this Procedure while using **machinery** including the appropriate training of all employees regarding the proper use of machine guarding devices.
 - e. NETL Employees shall:
 - (1) Comply with the safety guidelines and safety operating procedures set forth in this Procedure.
 - (2) Report any malfunctions of machines or missing or inoperative safeguards discovered or suspected to their supervisors.

7. TRAINING REQUIREMENTS.

- a. NETL employees who will be using guarded equipment shall be familiar with specific instructions regarding safe operation of the equipment.
- b. Line Managers shall ensure that all NETL employees are adequately trained in the use of machine guarding devices during the operation of guarded equipment. The Line Manager shall periodically review this Procedure with the employees and ensure that their questions are answered.
- c. Thorough operator training should involve instruction or hands-on training in the following:
 - (1) A description and identification of the hazards associated with particular machines.
 - (2) The machine safeguards and how they provide protection.
 - (3) How to use the safeguards and why their use is required.
 - (4) How and under what circumstances safeguards can be removed and by whom (in most cases, repair or maintenance personnel only).
 - (5) What to do (e.g., contact the Line Manager) if a safeguard is damaged, missing, or unable to provide adequate protection.
- d. Safety training is necessary for new operators, maintenance or setup personnel, when any new or altered safeguards are put in service, or when workers are assigned to a new machine or operation.

8. DOCUMENT CONTROL. The Line Manager shall maintain training records on employees who have received training.

9. PROCEDURE. Any machine part, function, or process that may cause injury must be safeguarded. When the operation of a machine or accidental contact with it can injure the operator or others in the vicinity, the hazards must be either controlled or eliminated.

a. Machine Guarding

- (1) Refer to 29 CFR 1910.212 for general requirements for guarding of machinery and machines.
- (2) Refer to 29 CFR 1910.213-219 for specific guarding requirements when working with:

- (a) Woodworking machinery,
- (b) Abrasive wheel machining,
- (c) Mills and calenders,
- (d) Mechanical power presses,
- (e) Forging machines, and
- (f) Mechanical power transmission apparatus.

b. General Machinery Safeguards

- (1) All moving machinery parts less than 7 feet above the working level shall be guarded whenever the movement could create a hazard to NETL site employees.
- (2) Infrequent or first-time users shall review all manuals and instructions provided by the machine manufacturer.
- (3) Users shall adjust the desired settings on the machine for proper operation; users shall select proper tools to install, secure all parts to their desired positions, and go through the checklist for setup specified in the operating procedures.
- (4) Each machine shall be equipped with a start/stop switch on the machine, preferably the push button recessed mushroom type. Emergency stop switches shall be installed where needed.
- (5) Each stationary machine shall be equipped with a reset device to prevent auto-restart of the machine following a power failure.
- (6) Machines designed for a fixed location shall be securely anchored to prevent walking or moving.

c. General Equipment Operation

- (1) All persons working on machines shall follow the established safety procedures for each piece of equipment during the operation of that equipment, including manufacturer operating instructions.
- (2) Equipment shall be de-energized by unplugging or other suitable means prior to guard removal or maintenance. Equipment which is hard wired must be locked/tagged out in accordance with NETL Procedure for Lockout/Tagout, prior to guard removal or maintenance.

d. Maintenance and Inspection

- (1) All machinery and machine guards shall be inspected by the equipment operator to determine that it is in safe condition prior to each use. Machine guards should be free from sharp edges, protrusions, etc., that could cause the guard to become a hazard.
- (2) All machines that have warning or danger signage shall be inspected periodically to insure that the signage is clear, legible and not damaged, defaced, or removed.
- (3) Defective equipment shall be removed from service immediately and plainly identified as defective in accordance with NETL Procedure for Lockout/Tagout.
- (4) Equipment shall be maintained according to a schedule established as part of a preventive maintenance program.
- (5) Machines must be operated per recommendations and instructions provided in the equipment operating manual(s).

Director, OIBO