



The 5 most common ways of machine guarding

- ✦ Barrier Guards
- ✦ Presence sensing
- ✦ Pull outs / Restraints
- ✦ Two Hand controls / Two hand Trip
- ✦ “A” and “B” Gates



4206 SAFEGUARDING THE POINT OF OPERATION

(a) General. The employer shall provide and ensure the use of properly applied and adjusted point of operation devices or guards for every operation performed on a power operated press.

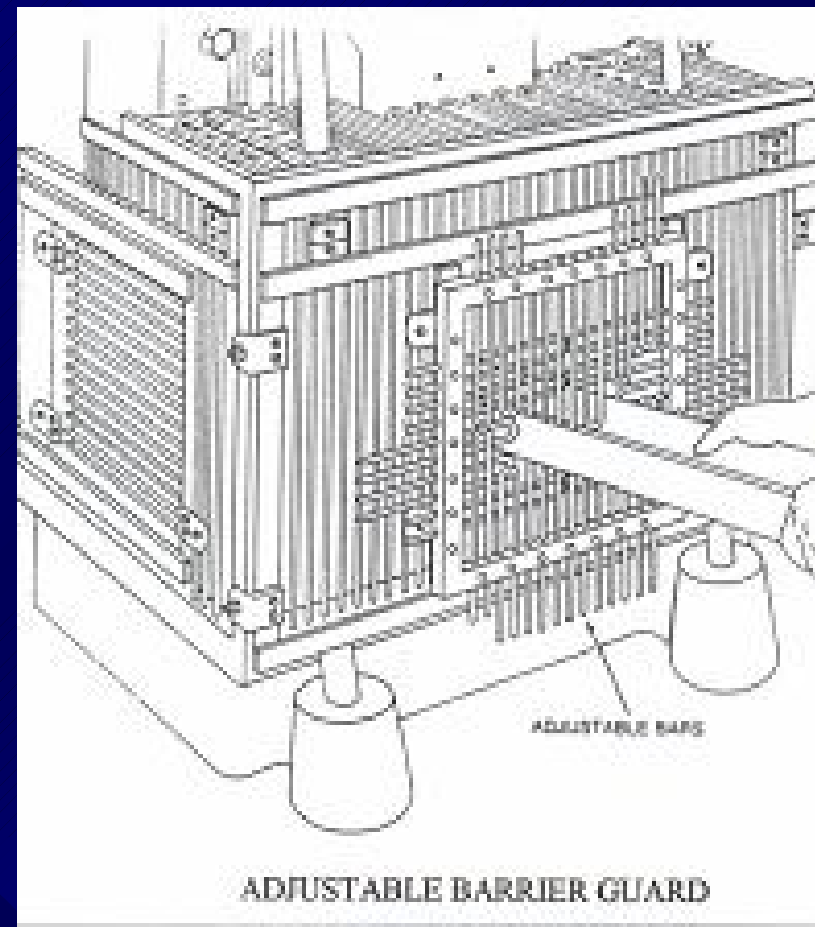
(b) Where point of operation guards are used in conjunction with point of operation devices, the safeguarding shall meet the requirements of Article 55.

EXCEPTION: When the point of operation opening is one-fourth-inch or less. See Figure G-8.

4207 POINT OF OPERATION GUARDS

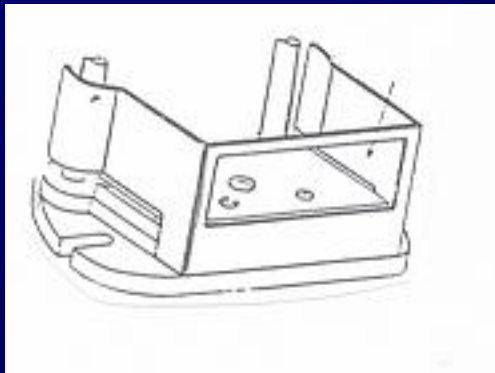
(a) Every point of operation guard shall meet the following design, construction, application, and adjustment requirements:

- (1) It shall prevent entry of hands or fingers into the point of operation by reaching through, over, under, or around the guard;
- (2) It shall conform to the maximum permissible openings of Figure G-8 and Table G-3;
- (3) It shall, in itself, create no pinch point between the guard and moving machine parts;



4207 POINT OF OPERATION GUARDS CONTINUED

- (4) It shall utilize fasteners not readily removable by operator, so as to minimize the possibility of misuse or removal of essential parts (requiring tools such as an Allen, adjustable, or end wrench);
- (5) It shall be able to accommodate required die, press or guard component inspection, and
- (6) It shall offer maximum visibility of the point of operation consistent with the other requirements.
 - (b) A die enclosure guard shall be attached to the die shoe or stripper in a fixed position.



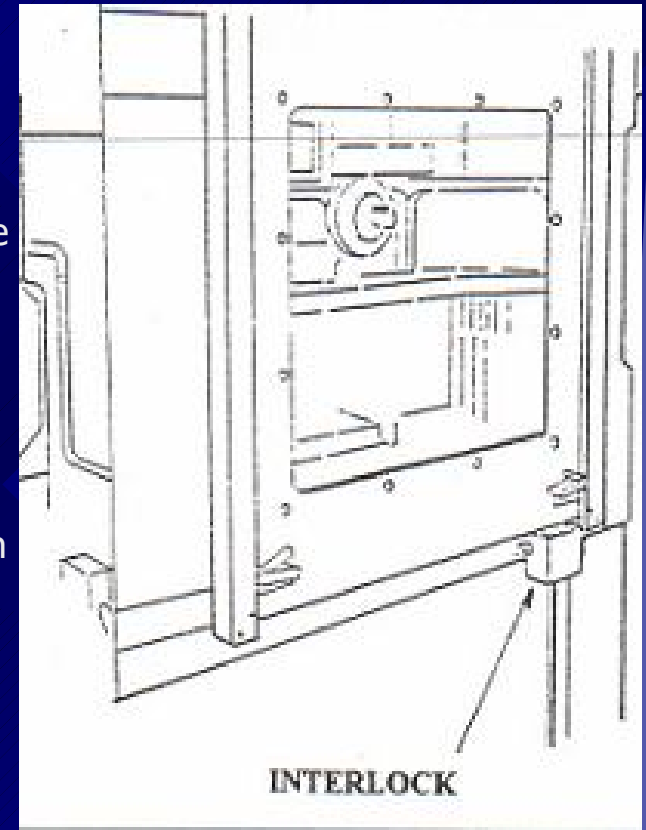
**BARRIER GUARDS
SHAPED TO FIT
AROUND PUNCH**

4207 POINT OF OPERATION GUARDS CONTINUED

(c) An interlocked press barrier guard shall be attached to the press frame or bolster and shall be interlocked with the press clutch control so that the clutch cannot be activated unless the guard itself, or the hinged or movable sections of the guard are in position to conform to the requirements of Figure G-8 and Table G-3.

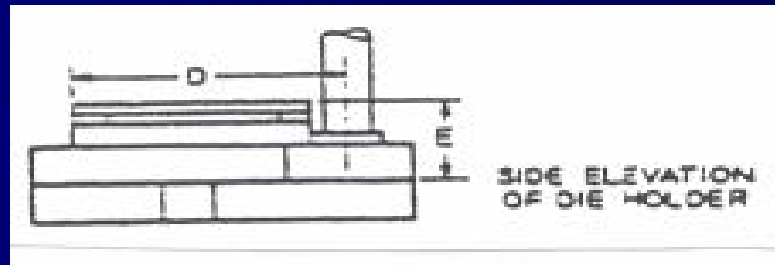
(d) The hinged or movable sections of an interlocked press barrier guard shall not be used for manual feeding.

The guard shall prevent opening of the interlocked section and reaching into the point of operation prior to die closure or prior to the cessation of slide motion. See section 4208 regarding manual feeding through interlocked (movable/gate) barrier devices.



4207 POINT OF OPERATION GUARDS CONTINUED

(e) bolster plate, or die shoe, and shall be adjusted and operated in conformity with Table 1 and the requirements of this subparagraph. Adjustments shall be made only by authorized personnel whose qualifications include knowledge of the provision of table 1 and this subparagraph [same as Table G-3].



[ANSI B11.1,6.2.5]. A point of operation enclosure which does not meet the requirements of this section and Figure G-8 and Table G-3 shall be used only in conjunction with point of operation devices to fully close off the remaining point of operation Hazard.



4208 POINT OF OPERATION DEVICES

4208 POINT OF OPERATION DEVICES

- (a) Point of operation devices shall protect the operator by:
 - (a) (1) Preventing and/or stopping normal stroking of the press if the operator's hands are inadvertently placed in the point of operation.
 - (a) (2) Preventing the operator from inadvertently reaching into the point of operation or
 - (a) (3) Withdrawing his hands if they are inadvertently located in the point of operation, as the dies close; or

4208 POINT OF OPERATION DEVICES CONT.

(a) (4) Preventing the operator from inadvertently reaching into the point of operation at all times; or

(a) (5) Requiring application of both of the operator's hands to machine operating controls and locating such controls at such a safety distance from the point of operation that the slide completes the downward travel or stops before the operator can reach into the point of operation with his hands; or

(a) (6) Enclosing the point of operation before a press stroke can be initiated, and maintaining this closed condition until the motion of the slide has ceased; or

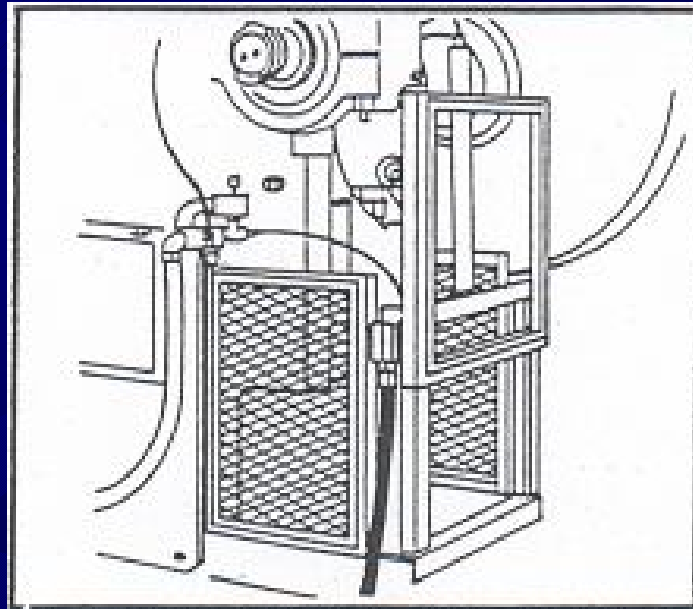
(a) (7) Enclosing the point of operation before a press stroke can be initiated, so as to prevent an operator from reaching into the point of operation prior to die closure or prior to cessation of slide motion during the downward stroke.

4208 POINT OF OPERATION DEVICES CONT.

(b) A gate or movable barrier device shall protect the operator as follows:

(b) (1) A type A gate or movable barrier device shall protect the operator in the manner specified in paragraph (a) (6) of this section; and

(b) (2) A Type B gate or movable barrier device shall protect the operator as specified in paragraph (a) (7).



4208 POINT OF OPERATION DEVICES CONT.

PRESENCE SENSING DEVICES

c) A presence sensing point of operation device shall protect the operator as provided in paragraph (a) (1) of this section, and shall be interlocked into the control circuit to prevent or stop slide motion if the operator's hand or other part of his body is within sensing field of the down stroke of the press slide.

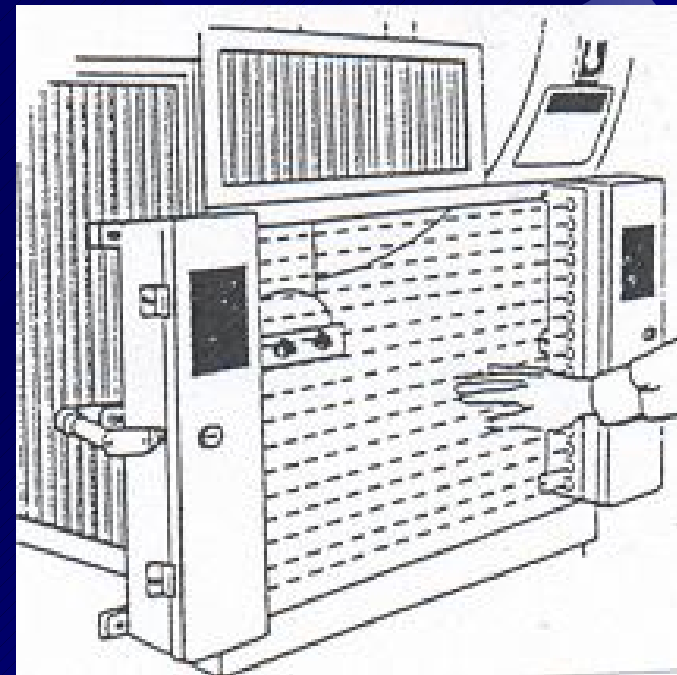
(c) (1) The device may not be used on machines using full revolution clutches.

(c) (2) The devices may not be used as a tripping means to initiate slide motion.

(c) (3) The device shall be constructed so that a failure within the system does not prevent the normal stopping action from being applied to the press when required, but is indicated by the system.

NOTE: Muting (bypassing of the protective function) of such device during the upstroke of the press slide, is permitted for the purpose of parts ejection, circuit checking, and feeding and when material in contact in

With the dies being formed on a press brake passes through the sensing field.



4208 POINT OF OPERATION DEVICES CONT.

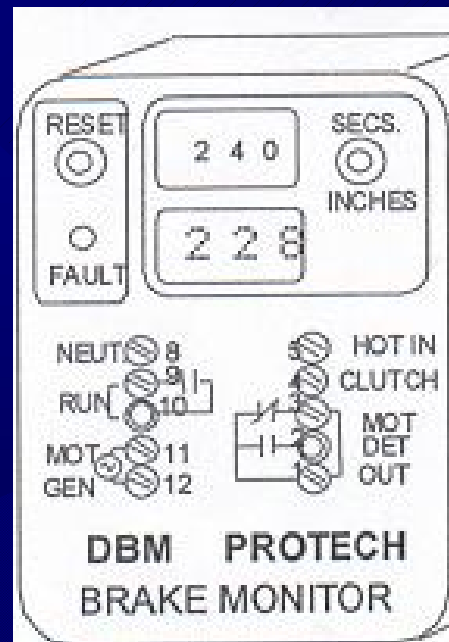
(c) (4) The safety distance (D_s) from the sensing field to the point of operation shall be greater than the distance determined by the following formula.

$D_s = 63 \text{ inches/second} \times T_s$, Where
 D_s + Minimum safety distance (inches);
63 inches/second = hand speed constant;
and T_s = stopping time of the press measured
at approximately 90 degree position of
crankshaft rotation (seconds)

(c) (5) Guards or other means shall be used to protect all areas of entry to the point of operation not protected by the presence sensing device. (See Section 4207, (g))

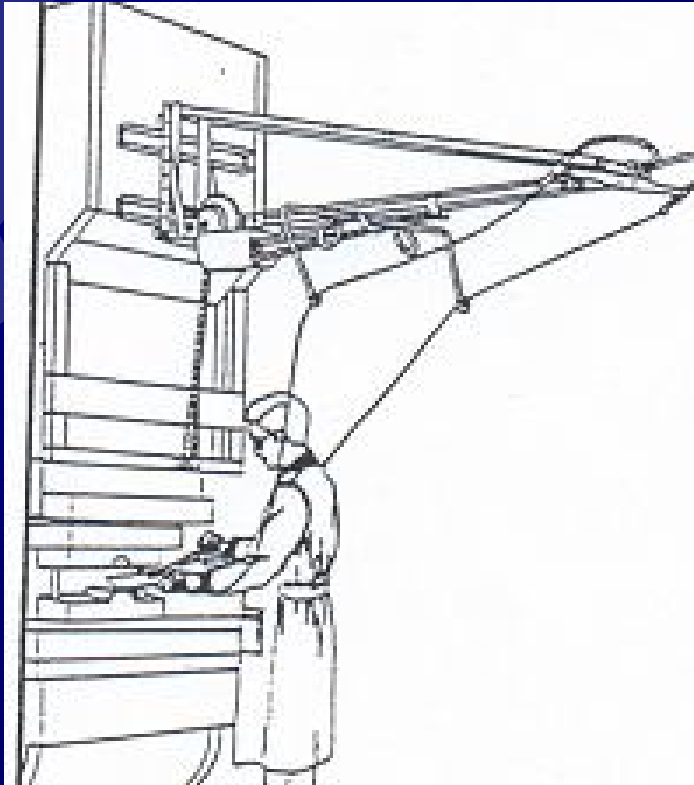
4208 POINT OF OPERATION DEVICES CONT.

[NOTE: ANSI B11.1 amends the above formula to require additional safety distance factors to also include maximum response time of presence sensing device plus its' penetration factor. A portable or machine mounted brake monitor, is commonly used to determine the stopping performance and safety distance calculations for the safe location mounting of Hand Controls and Presence Sensing Devices.]



PULL-OUT

- (d) The pull-out device shall protect the operator as specified in paragraph (a)
- (3) Of this section and shall include attachments for each of the operator's hands.



Form 10-1010
10/01

PULLOUT HOLDOUT DEVICE INSPECTION REPORT

FOR -- USE OF MAINTENANCE AND REPAIR
FOR -- SAFETY ADJUSTMENT

TRUCK NO. _____ ENGINE SERIAL NO. _____

FOR OFFICIAL USE AND REGISTRATION PURPOSES:

DATE	TIME	INSPECTOR NAME AND TITLE	STATUS (Satisfactory/Unsatisfactory)	SUBJECT (Make, Model, Serial No.)

INITIAL HERE 



PULL-OUT CONTINUED

(d) (1) Attachments shall be connected to and operated only by the press slide or upper die.

(d) (2) Attachments shall be adjusted to prevent the operator from reaching into the point of operation or to withdraw the operator's hands from the point of operation before the die closes.

(d) (3) A separate pull-out device shall be provided for each operator if more than one operator is used on the press.

(d) (4) Each pull-out device in use shall be visually inspected and checked for proper adjustment at the start of each operator shift following a new die setup and when operators are changed. Necessary maintenance or repairs or both shall be performed and completed before the press is operated. Records of Inspections and maintenance shall be kept in accordance with the requirements of this section.

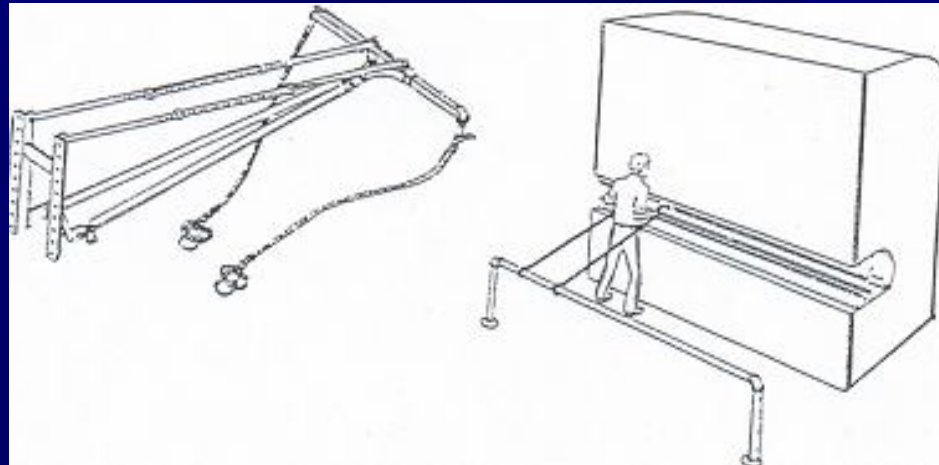
SWEEP DEVICES

(e) The sweep device may not be used for point of operation guarding.

RESTRAINT OR HOLDOUT

(f) A holdout or restraint device shall protect the operator as specified in paragraph (a) (4) of this section and shall include attachments for each of the operator's hands. Such attachments shall be securely anchored and adjusted in such a way that the operator is restrained from reaching into the point of operation. A separate set of restraints shall be provided for each operator if more than one operator is required on a press.

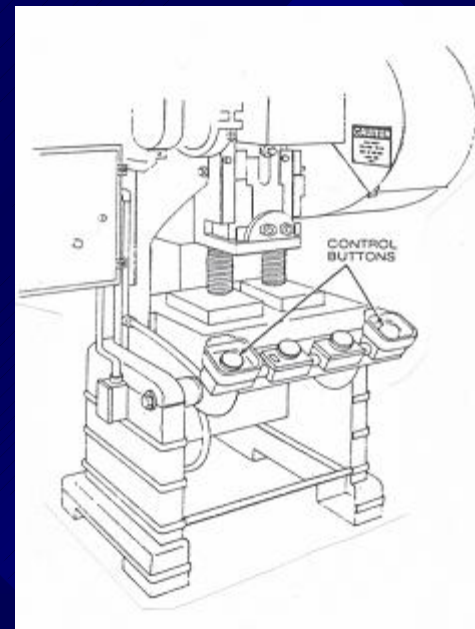
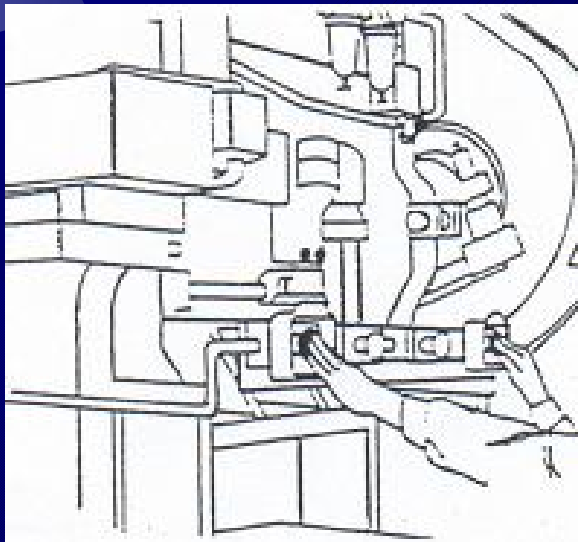
Operator's Restraint Device for Point-of- Operation Protection



TWO-HAND CONTROL

(g) The two-hand control device shall protect the operator as specified in paragraph (a) (5) of this section.

(g) (1) shall be provided for each operator and shall be designed to require concurrent application of all operators' controls to activate the slide. The removal of a hand from any control button shall cause the slide to stop.



TWO-HAND CONTROL CONTINUED

(g) (2) Each two-hand control shall meet the requirements of this section.

(g) (3) The safety distance (D_s) between each two-hand control device and the point of operation shall be greater than the distance determined by the following formula.

$D_s = 63 \text{ inches/second} \times T_s$; where:

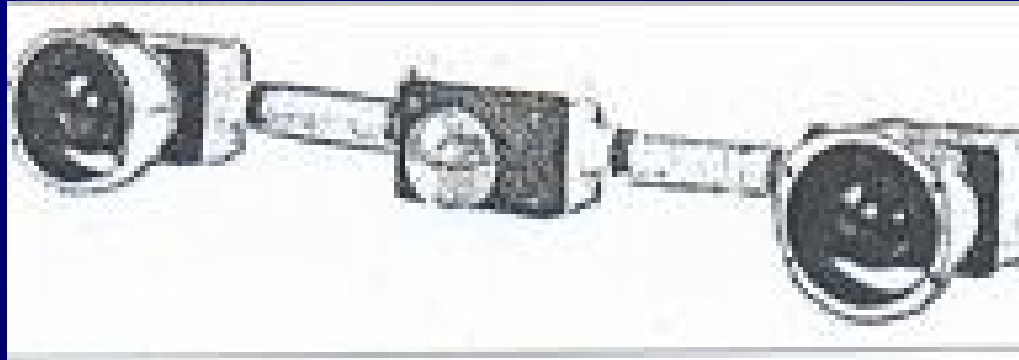
D_s = minimum safety distance (inches)

63 inches/seconds = hand speed constant; and T_s = stopping time of the press measured at approximately 90 degree position of the crankshaft rotation (seconds)

TWO-HAND TRIP

(h) The two-hand trip device shall protect the operator as specified in paragraph (a) (5) of this section.

(h) (1) When used in press operations requiring more than one operator, separate two-hand trips shall be provided for each operator, and shall be designed to require concurrent application of all operator controls to activate the slide.



TWO-HAND TRIP CONTINUED

(h) (2) Each two-hand trip shall meet the construction requirements of this section.

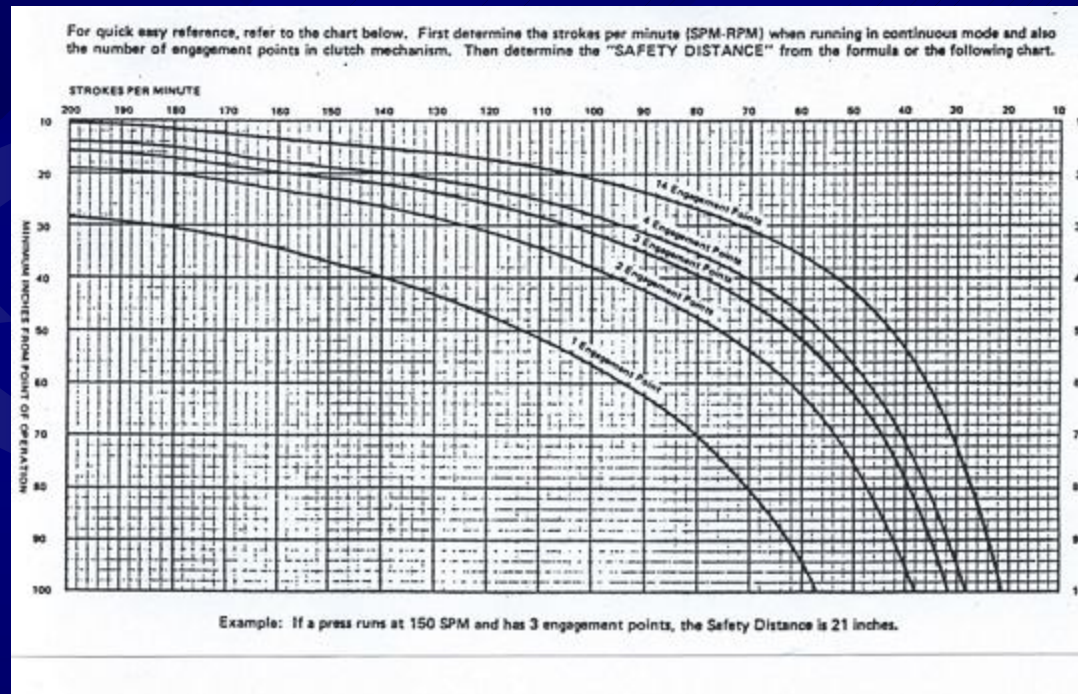
(h) (3) The safety distance (D_m) between the two-hand trip and the point of operation shall be greater than the distance determined by the following formula:

$D_m = 63 \text{ inches/seconds} \times T_m$; where:
 D_m = minimum safety distance (inches);
63 inches/seconds = hand speed constant; and
 T_m = the maximum time the press takes for the die closure after it has been tripped (seconds)

For full revolution clutch presses with only one engaging point T_m is equal to the time necessary for one and one-half revolutions of the crankshaft. For full revolution clutch presses with more than one engaging point, T_m shall be calculated per the chart on the next page as follows:

$$T_m = \frac{1}{2} + \frac{1}{\text{number of engagement points}} \times \text{Time to complete one revolution (seconds)}$$

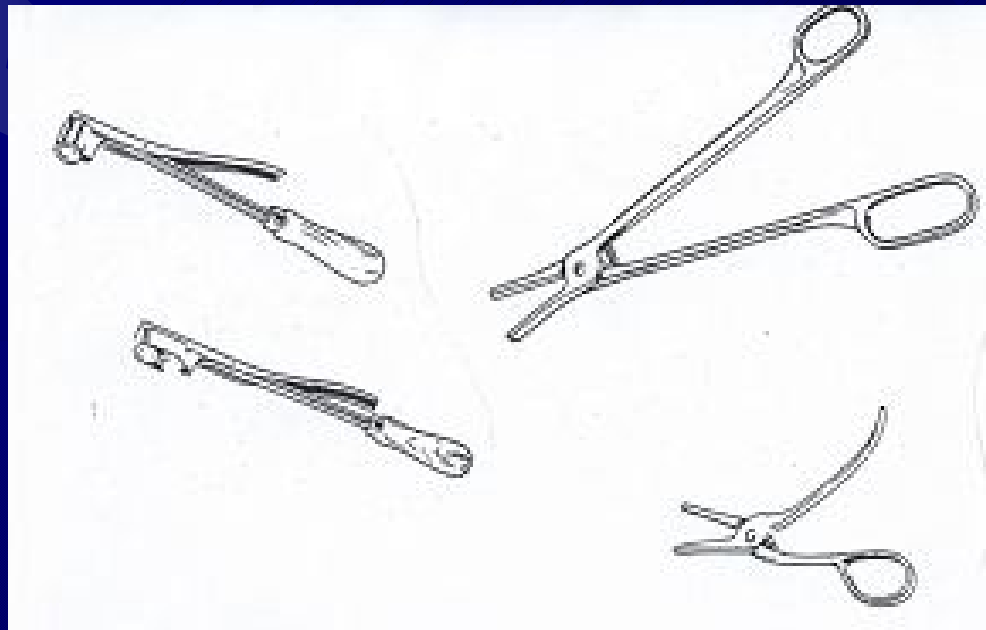
TWO-HAND TRIP CONTINUED



(h) (4) Two-hand trips shall be fixed in position only by a qualified and authorized person or safety engineer capable of establishing the safe location or relocating the controls. If pedestal or pendant mounted, the location of the pedestal shall be determined by the employer in association with the requirements of subsection (h) (3).

HAND FEEDING TOOLS

(i) Hand feeding tools are intended for placing and removing materials in and from the press. **Hand feeding tools are not a point of operation guard or protection device and shall not be used in lieu of the "guards" or devices required in this section** (See Section 4197) [Design tooling to eliminate Hand Feeding Operations].



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With Light Curtain and Ergonomic Palm Buttons



New control with Time based Brake Monitor and Control Reliability



Full Revolution Punch Press



With New motor controls, palm buttons, interlocked guarding for foot mode, and dual valve for control reliability.



Hydraulic punch press



With new ergonomic palm buttons and Barrier guards



Mechanical press brake



Hydraulic press brake



With light curtain, interface, side and rear guarding.





Protech Systems Services

- ☀ 1. Safety Surveys
- ☀ 2. Safety Products
- ☀ 3. Installation / Integration
- ☀ 4. Certification and Calibration
- ☀ 5. Training and Safety Seminars



Protech Systems

- ✦ Family business started over 25 years ago (1978).
- ✦ Protech specializes in machine guarding and electronic protection.
- ✦ Manufacture, sell and install press brake controls, light curtains, mechanical safety devices (guards, Safety Blocks)
- ✦ Services covered by \$ 2 Million Liability Insurance



Protech Systems

- ✦ Located in Southern California since 1978.
- ✦ All operations in a local facility.
 - ✦ Manufacturing
 - ✦ Safety Training
 - ✦ Engineering and Administration



Safety Surveys – Protech offers, Safety Surveys of your plant or department. Our expertise covers,

- power presses
- shears
- robotics
- riveting equipment
- saws
- routers
- drills
- mills
- custom machines

- lathes
- benders
- grinders
- buffers
- projection and spot welders
- bending rolls
- sheet metal rolls
- slitters



Installations –

- ✦ Protech offers factory installation of safety products.
- ✦ Large base of safety installations in So. Cal
- ✦ Factory installation available in all of North America

Certifications –

- ✦ Protech offers certifications and calibrations of brake monitors, tonnage monitors, OSHA and ANSI safety distance and training at our facility.



Training and Safety Seminars –

- ★ Protech offers safety seminars on machine tool guarding to assist companies in meeting OSHA guidelines regarding hazards in machine operations.
- ★ Seminars provide classroom instruction and hands-on demonstration using production machines on either your or our factory floor.
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