

CINCIINNATI®

PRESS BRAKE SAFEGUARDING



SUGGESTIONS FOR OWNERS AND
THEIR EMPLOYEES



AS EMPLOYERS WE SHARE A CRUCIAL RESPONSIBILITY:

To provide a safe workplace for our employees. This booklet offers some of the ideas and methods we suggest for safeguarding employees using press brakes. The steps presented here have proven themselves in actual practice over a wide range of applications.

While CINCINNATI press brakes are designed and built to be reliable, many operating variables affect the potential safety of operators: tooling, piece part, methods of feeding and removal of work pieces and the type of press brake being used. Of course, your selection of adequate safeguarding must be made to fit each specific application and shop environment.

CINCINNATI safeguarding devices, along with safeguarding equipment from other manufacturers, are shown in this booklet. Additional suggestions to meet specific needs are available from CINCINNATI's Product Safety Department.

We hope you will pass along our suggestions to the personnel in your organization who are responsible for safe operation of press brakes. With your help, we can all strive toward safer, more productive workplaces.

IT IS THE EMPLOYER'S RESPONSIBILITY

TO SAFEGUARD THE POINT OF OPERATION OF PRESS BRAKES.

The press brake itself is a long, narrow power source with the capability of accepting dies and exerting force to form metal, but it is not complete. Dies, piece part, operator, method of bending and safeguarding are elements required to complete the system --- and only the employer has all of the operating facts required to determine proper safeguarding.

SELECTING A GUARD, DEVICE OR METHOD FOR POINT OF OPERATION SAFEGUARDING

Your objectives should be to: 1) eliminate the need for an operator or helper to place any part of his or her body within, or even near, the point of operation when loading, forming or unloading the piece part and 2) choose a guard, device or an operating method which will prevent entry or stop die closing if the operator or operators inadvertently enter the point of operation. The selection of safeguarding and operating procedures is best accomplished by analyzing all the factors which make up the forming system and its relationship with the system operator.

This booklet presents several methods of selecting safety devices and guards for press brakes by looking at a few specific part forming jobs. While some of these methods may not be new to your experienced employees, they are good reminders and will aid in training your new personnel.

PLEASE NOTE THAT ///

- Different safeguarding arrangements are required to fit specific applications. There is no known universal safeguard for all press brake work.
- Not all of the guards and devices shown are available from Cincinnati Incorporated. A partial list of sources is included on the back cover. Additional sources will be furnished upon request.
- Users should follow specific instructions from the safeguard manufacturer for proper installation, adjustment and use of each guard or device. Exercise caution when selecting and placing guards so that new hazards are not created. Interface questions relative to CINCINNATI press brakes should be directed to the CINCINNATI Service Department.

PRESENCE SENSING DEVICE (PSD)

A photo-electric Presence Sensing Device is the most common type of PSD utilized as a point of operation safeguard for press brakes. It serves to stop ram motion or prevent initiation of that motion should the sensing field be interrupted by some object.

When applied to press brakes as safeguarding for the point of operation, the PSD must stop or prevent ram motion during the downward movement of the ram, (upward movement on up acting machines), but allow motion as the bending action begins and the piece part passes through the presence sensing field. This is accomplished through a setting called the “Mute” adjustment on the press brake control. Essentially, the press brake is told to ignore the signal from the PSD when the mute setting is ON.

The setting of the Mute position depends upon the application. As an example, the setting for a simple 90° bend might be a point when the nose of the upper die is less than 1/4” above the piece part. Mute would turn OFF when the ram has completed its return travel to the top of the stroke. With this setting, the press brake ram would not stop when the piece part is “seen” by the PSD as it passes through the sensing field.

Another common adjustment is “Blanking”. Blanking is an adjustment to the PSD itself. It allows for the “disabling” of individual beams of the sensing field so a selected object passing through the sensing field will not be seen by the PSD and ram motion is allowed. Blanking is commonly used when material support arms extend off the front of the bed toward the operator.

To maintain proper safeguarding and prevent improper setting of Mute and Blanking, these adjustments must be supervisor controlled.

NOTE /// The workpiece is supported by hand below, “palms up,” and the operator is standing clear of the top edge to prevent injury when the workpiece moves up. It is necessary to establish proper work procedures along with adequate safeguarding.

AN IMPORTANT FEATURE FOR THE OPERATOR /// is a warning light indicating the status of the safeguard.

A “Guard Off” light, located within view of the operator, tells if the PSD is OFF (inactive), as below when MUTE is ON, and when the PSD is ON (active), as below when only one or two beams are turned off due to Blanking.



The operator loads the workpiece. **NOTE** /// Blanking is used to accommodate the use of material support arms.

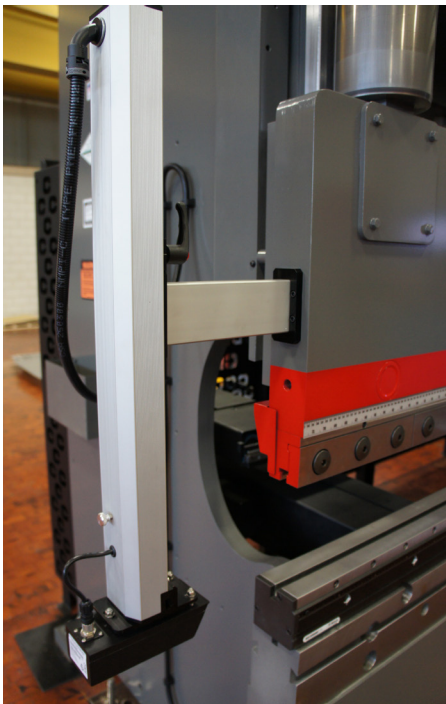


The workpiece has moved up through the sensing field during the forming operation. The “Mute” adjustment was ON to allow this and a corresponding “Guard Off” warning light is ON alerting the operator of the status of the safeguard.

LASER GUARDING SYSTEMS

Another option for hydraulic press brakes is the close proximity Active Opto-electronic Protective Device (AOPD), or the laser-type guarding device. Laser guarding devices utilize a transmitter and receiver mounted on opposite ends of the ram to create a sensing zone (or grid) behind, under, and in front of the upper die tip. Any interruption of this sensing zone will prevent machine operation or immediately stop the ram's motion.

The laser safeguarding device travels with the ram to stop or prevent ram motion if an obstruction is sensed during high speed downward movement (or upward movement



on up acting machines), while allowing slow ram speeds as the bending action begins. This is accomplished through a setting called “Muting” of the protective sensing zone.

Muting is controlled by the laser guarding device or the press brake control, and may affect ram speed. The press brake must be equipped with a hold-to-run

control, such as a three position footswitch, that will stop hazardous ram movement if released or fully depressed.

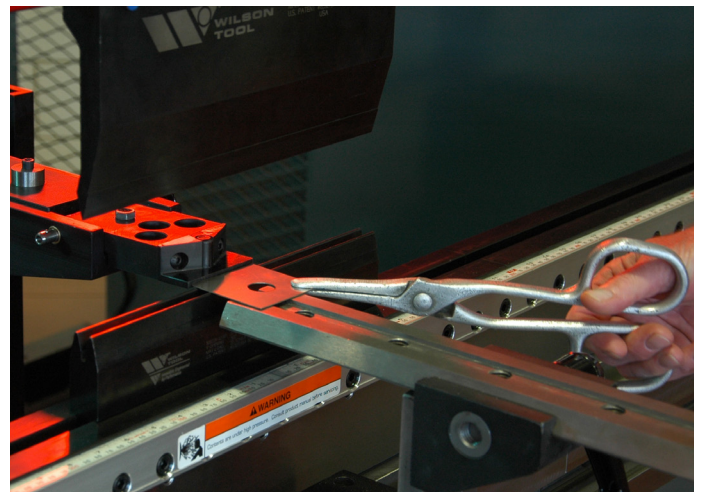
Another setting is called “Blanking.” Blanking mode, a function of the laser guarding device itself, allows for the “disabling” of a portion of the sensing area (or grid) so that a selected object in the sensing field will not prevent high speed ram motion. Blanking is commonly used when box bending or compensating for backgauge fingers in the rear. The sensing area under the upper die must remain active for high speed operation.

DUAL PALMBUTTONS WITH SUPPLEMENTAL SAFETY HAND TOOLS



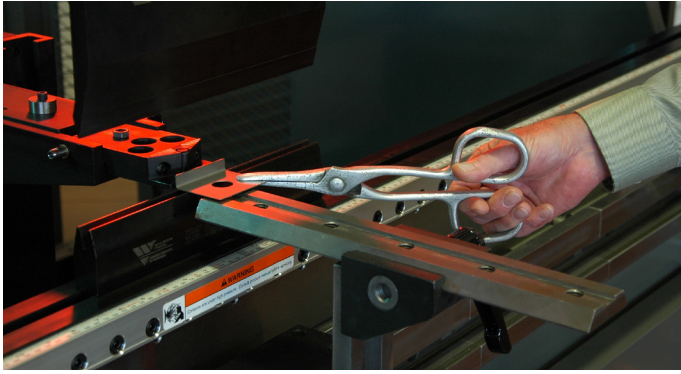
Dual palmbuttons cycle the ram of the press brake

The operator must use hand tools to load and unload a small work piece so that there is no need to reach near or into the dies. Both hands are required to hold dual palmbuttons during the downstroke.



Hand tools are used to load a small work piece.

NOTE /// Palmbuttons used as point-of-operation safeguarding device must be positioned at the proper distance from point-of-operation hazards. This distance should take into consideration operator hand speed, control reaction times and machine stopping times. See ANSI B11.3 for details.



Hand tools are used to remove the part from the die.



The operator activates the press brake using the dual palm buttons.

END BARRIERS

Often press brake dies cannot be cut (or sized) to match the piece part being formed. End barriers are fixed guards which prevent entry to the unused portion of full length dies.



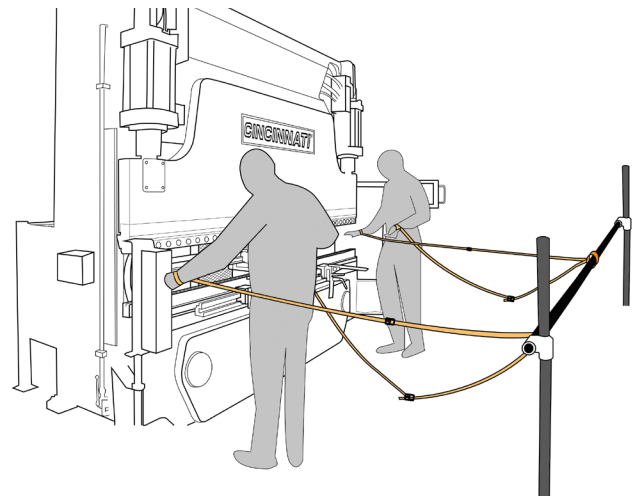
End barrier and front-mounted partial barrier safeguard the ends of these full length dies.

RESTRAINTS

In the illustration below, a CINCINNATI press brake is being used in a bumping operation.

Restraints are anchored in a location that restricts hands from entering the point of operation, but permits stacking finished pieces and obtaining new blanks.

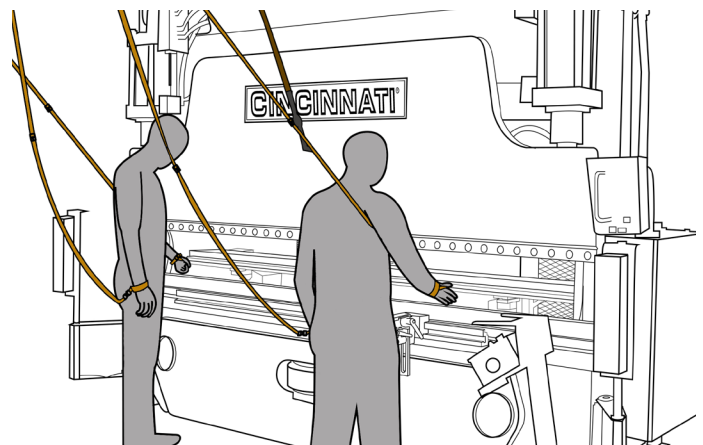
NOTE /// The properly adjusted restraints on each person. The work piece is supported from below to prevent injury when the work piece moves up.



Restraint devices restrict hands from entering the point of operation. These devices also restrict operator movement during loading and unloading of piece parts.

PULL-BACKS

In the illustration below, operators perform die set work at two locations. Pull-backs on the ram are properly adjusted to safeguard hands from the point of operation.



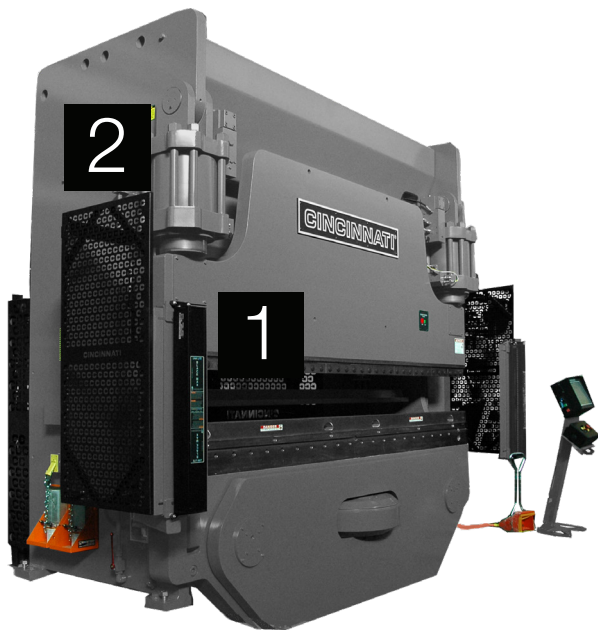
Pull-backs safeguard both operators while loading the work area.

SPECIAL SAFEGUARDING REQUESTS

CINCINNATI press brakes can be manufactured to comply with a variety of international, federal, state or local safety requirements. Purchasers specify the safety features that meet the requirements of the directive, standard or special code the equipment must meet for use in a designated part of the world.

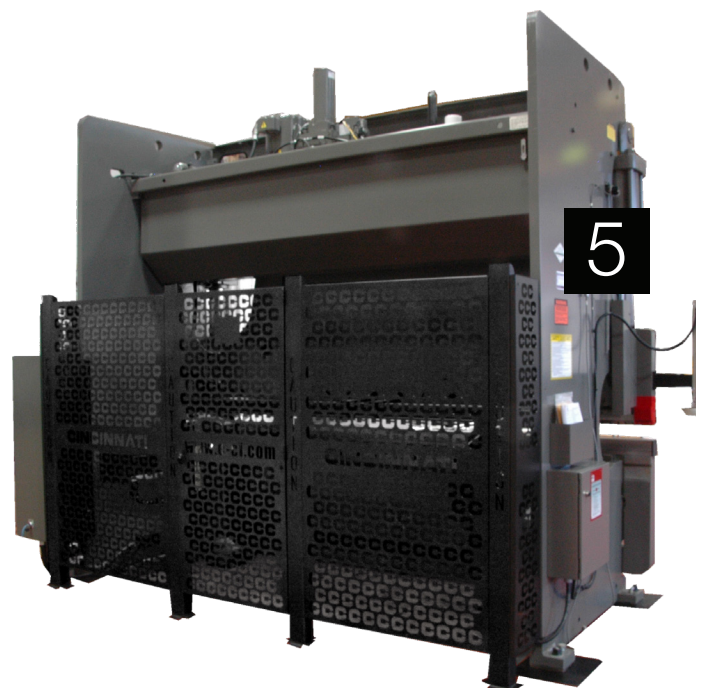
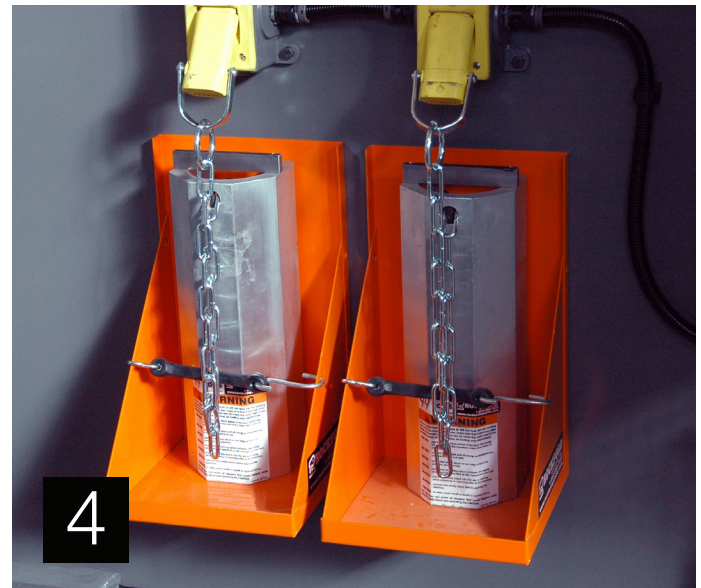
SAFEGUARDING ON THE MACHINES SHOWN INCLUDE:

1. Presence Sensing Device (PSD)
2. End guards with electrical interlocks
3. Pedestal-mounted dual palmbuttons
4. Safety blocking
5. Rear fence guard with interlock gate



This press brake is equipped with a variety of safety guards and devices which allow it to be certified for a specific safety standard.

NOTE /// As with nearly all guarding installed on press brakes, the features on the press brakes shown here restrict their use. However, analysis of your press brake work may reveal that a similar approach is workable in your plant and may help to meet your governmental safety requirements.

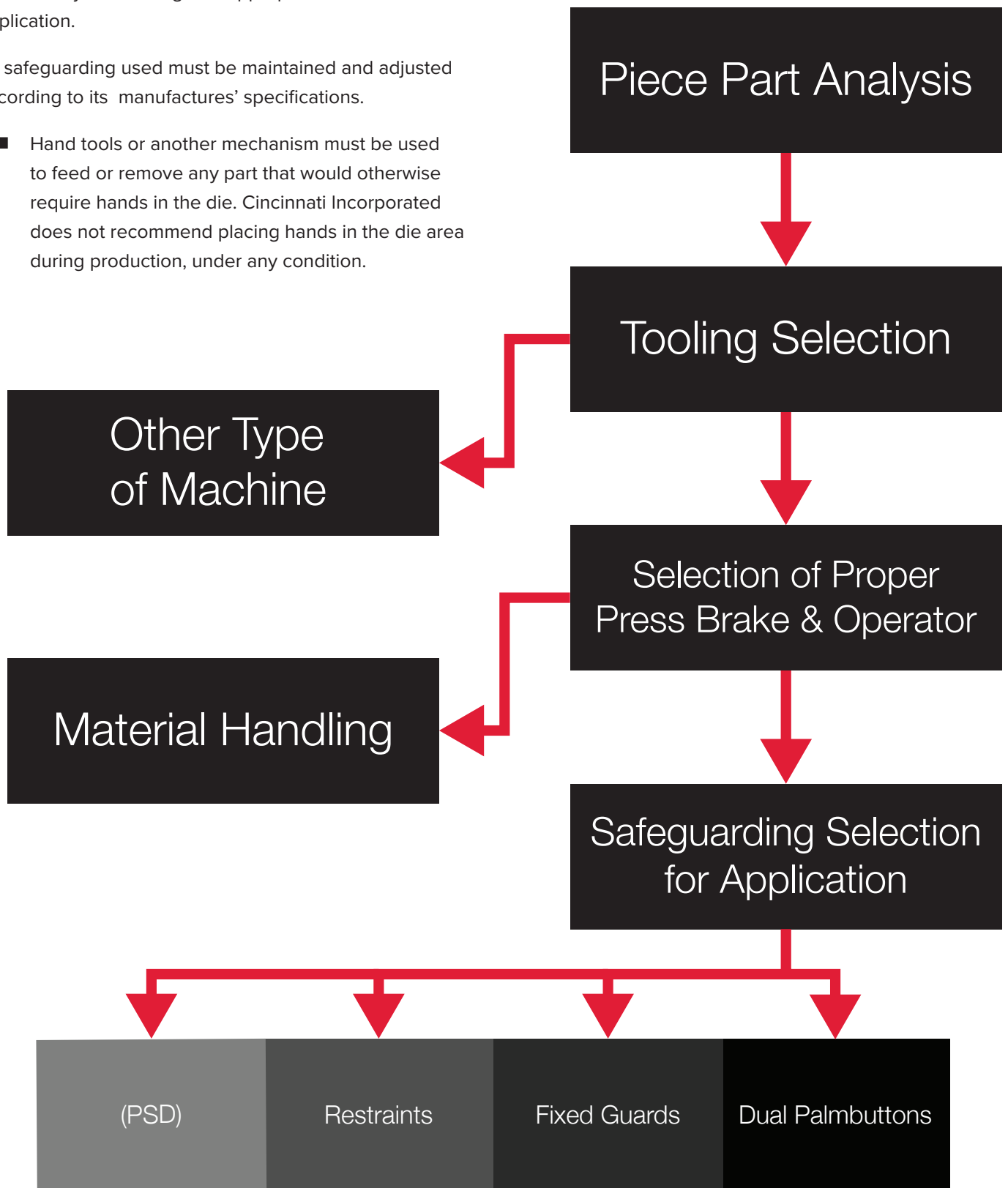


SAFEGUARDING SELECTION PROCESS

Use a safety device or guard appropriate for the application.

All safeguarding used must be maintained and adjusted according to its manufactures' specifications.

- Hand tools or another mechanism must be used to feed or remove any part that would otherwise require hands in the die. Cincinnati Incorporated does not recommend placing hands in the die area during production, under any condition.



AS AN EMPLOYER YOU HAVE THE RESPONSIBILITY

to furnish to each of your employees “...employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees,” - Section 5(A) (1) of the Occupational Safety and Health Administration directive. OSHA further requires “One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, in-going nip points, rotating parts, ...” - Sub-Part “O,” Section 1910.212.

The ANSI B11.3 Press Brake Safety Standard (American National Standards Institute, Inc.) also requires the employer to provide point of operation safeguarding. This standard, under the Safeguarding Section, provides for the selection of various methods of safeguarding to meet the requirements of specific jobs. It is evident that OSHA and ANSI recognize that employers are the ones who must provide for the safety of workers through safeguarding of machinery, training and safe work practices.

We believe this booklet will help you in providing a safe workplace for your press brake operators. Write us if you would like additional information, a proposal on safeguarding or a proposal for updating your CINCINNATI press brakes to comply with the construction requirements of OSHA and ANSI B11.3.

SOURCES FOR PRESS BRAKE SAFEGUARDING

For your convenience, we have compiled the following partial list of companies, besides Cincinnati Incorporated, who provide safeguarding for press brakes. This list has been developed from various safety directories and magazines but is not intended to be a complete list nor does it constitute a recommendation by Cincinnati Incorporated.

Company Name	Safeguarding Options Available
Banner Engineering Corporation 9714 10th Ave. N., Minneapolis, MN 55441 +1 (763) 544-3164 bannerengineering.com	Presence Sensing Devices
Fiessler Elektronik Kastellstr. 9, D-73734 Esslingen, Germany 49(711) 91 96 970 FAX: 49(711) 91 96 975 fiessler.de	Presence Sensing Devices
ISB Products 2300 Victoria Ave, Lachine, Quebec, H8S 1Z3, Canada (514) 634-7000 FAX: (514) 634-9868 isblite.com	Presence Sensing Devices Dual Palm Buttons
Lazer Safe Pty Ltd. 27 Action Rd., Malaga, WA 6090, Australia +61 8 9249 4388 FAX: +61 8 9249 6011 lazersafe.com	Presence Sensing Devices
Link Systems 444 McNally Dr., Nashville, TN 37211 (615) 833-4168 FAX: (615) 834-1984 linkelectric.com	Presence Sensing Devices
Osborn Manufacturing Corporation 960 North Lake Street, Warsaw, IN 46580 (574) 267-6156 FAX: (574) 267-6527 osbornmfg.com	Hand Tools
Protech Systems 3100 E. Cedar Street, Suite #4, Ontario, CA 91761 (909) 590-9521 protechsystems.com	Presence Sensing Devices Pull Backs & Restraints Drop Gate Guards Dual Palm Buttons Hand Tools Safety Blocks
Rockford Systems Inc. 4620 Hydraulic Road, Rockford, IL 61109-2695 (815) 874-7891 rockfordsystems.com	Presence Sensing Devices Pull Backs & Restraints Drop Gate Guards Dual Palm Buttons Hand Tools Safety Blocks
SICK 6900 W 110th Street, Minneapolis, MN 55438 (952) 829-4728 FAX: (952) 941-9287 sick.com	Presence Sensing Devices
Tapeswitch Corporation 100 Schmitt Boulevard, Farmingdale, NY 11735 1 (800) 234-8273 tapeswitch.com	Presence Sensing Devices
Triad Controls Incorporated PO Box 99875, Pittsburgh, PA 15233 (412) 262-1115 FAX: (412) 262-1197 triadcontrols.com	Presence Sensing Devices Dual Palm Buttons

For additional information we recommend:

- Securing applicable safety data sheets from the National Safety Council, 1121 Spring Lake Drive, Itasca, IL 60143-3201, 1 (800) 621-7619, nsc.org
- Determining your responsibilities under your national, state, and local safety codes.
- Requesting assistance from the loss prevention department of your workers' compensation carrier.