

Are Your Press Brakes Safe?

Fabricators often utilize press brakes without fully considering the entire safety system or even the most obvious point of operation hazards. Press brake fabrication generally requires the operator to hold the work piece in close proximity to the point of operation while bending, forming, notching, or punching is performed. Point of operation guarding is complicated by the close proximity of the operator to a pinch point and the potential for complex operational sequences.

Fabricators often employ lower cost, used or refurbished equipment where the primary controls system and/or condition of the machine and its safety system may be suspect. When fabricators are able to purchase new equipment they should make safety system criteria an equal priority to the production and setup characteristics of the machine. Original equipment manufacturers (OEM's) generally consider the point of operation aspect of the safety system to be the user's responsibility. Fabricators may not have anyone on staff that has safety system or safeguarding competency. As a result risk assessment is seldom considered or completed.

Press Brakes Must Comply with OSHA & ANSI Performance Specifications

Unlike the relatively similar power press, press brakes are exempt from Occupational Safety and Health Act (OSHA) standard 1910.217. Instead press brakes need to comply with OSHA's machine guarding performance specification 1910.212 general requirements for all machines.

"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, ingoing nip points, rotating parts, flying chips and sparks. Examples of guarding methods are barrier guards, two-hand tripping devices, electronic safety devices, etc." (Occupational Safety and Health Administration, n.d., ¶ 1910.212(a)(1)).

The only safety system standard specifically applicable to power press brakes used in America is American National Standards Institute (ANSI) B11.3. ANSI reaffirmed B11.3 Safety Requirements for Power Press Brakes in June of 2007. The standard is "intended to devise and propose ways to minimize risks of the potential hazards."

An overall risk assessment that considers hazard severity, frequency of exposure, and probability of injury, as suggested by ANSI B11.TR3 is likely a better and more comprehensive approach to establish a safe and effective power press brake safety system. However, such an assessment is likely to require a third party safety expert. A typical press brake application used in a fabrication shop will likely pose many identifiable risks such as catastrophic point of operation hazards resulting in amputation, crushing, and/or death.

The ANSI B11.3 standard discusses hazards associated with the point of operation at length and identifies alternative guards and devices. These can be generally categorized as follows: fixed and interlocked barrier guards, moveable and/or sliding barrier guards, electro-optical presence sensing devices, pull-backs, restraints, two hand controls, and two-hand down/foot through controls. Another safeguarding concept, safe distance guarding, is neither a guard nor device but a method employed with restriction.

"Because of constraints imposed by certain manufacturing or fabricating processes, safeguarding by maintaining a safe distance from the point of operation may be acceptable but only when safeguarding by physical barrier or physical devices is not feasible. "Safe distance" means the clearance between an employee (typically his or her fingers holding and supporting a piece part) and the power press brake point

of operation.” (Occupational Safety and Health Administration, 1997, ¶ D.5)

Press Brake Safety – Point of Operation Guarding Options

Fixed and interlocked barrier guards as well as two hand controls are not a functional alternative for fabricators as the work piece is hand held in close proximity to the point of operation during the braking process and whips up as bending takes place. Pull-backs and restraints are possible alternatives but are restrictive and have limitations; operators hate them. Either device shackles the operator to the machine and restricts mobility. Furthermore they must be adjusted and inspected at each shift change, operator change, and die change.

A two hand down/foot through device will work in some cases. Here the operator initiates a stroke with a two-hand control and the ram moves to a stroke stop position leaving a .250 inch opening (an opening deemed small enough to be safe). Assuming the work piece profile allows, the operator positions the work in the tool and completes the stroke using the foot switch. This method raises ergonomic issues and it is very slow.

The electro-optical light curtain or laser beam device method is the most functional alternative; however, both require a special purpose device. A light curtain system must be designed to remember part profiles and have a muting circuit to (bypass) the system during the non-hazardous (upstroke) portion of the cycle. Laser optical devices are designed to be press brake specific and work with fast stopping hydraulic machines.

Press brakes are operator intensive – sometimes involving multiple operators – and their behavior is not always predictable. Setup people and material handlers add to the potential for unexpected behaviors and outcomes. Operators may bypass guarding systems to facilitate setup or increase production rates. Setup people may not follow lockout-tagout procedures, or material handlers may not use personal protection equipment. Some of these problems are easily foreseen but may not be easy to control.

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