

Technical note from Production Resources, Inc.

Factors to consider when attempting to bring Full Revolution Clutch Mechanical Power Presses into compliance with OSHA 1910.217 standards

Many employers continue to use full revolution clutch presses that are non compliant with current OSHA 1910.217 standards. Since this style press is capable of stopping only at top dead center point of operation safeguarding is more of a challenge than with air clutch presses. *Often the cost of bringing these machines into compliance exceeds their original cost and/or their replacement cost.*

Highlights of the OSHA standard requirements for full revolution clutch presses follow:

- The press must have a single stroke mechanism.** This is intended to apply to foot treadle operated machines and simply means that if the foot treadle is held down only one stroke will take place. This can be accomplished with a mechanical retrofit device or a conversion to an electro pneumatic two hand trip control system.
- If the press is equipped with a two hand trip it must have anti repeat capability.** If an operator holds the palm buttons down without releasing them only one stroke will occur.
- Two hand trip systems must require concurrent use of both hands to initiate a stroke.** The system must prevent an operator from tying down one palm button and actuating the press with only one button.
- The press must have a main power disconnect capable of being locked off.**
- The press must have a motor starter with under voltage protection (magnetic starter).**
- The press must have appropriate point of operation safeguarding.** The logical guarding options for a full revolution clutch press are dependent on how it's used. If the press is automatically fed the best choice is a fixed barrier guard compliant with the Table 0-10 guard opening table.

OSHA Table 0-10 (in inches)

Distance of opening from Point of Operation Hazard (inches)	Maximum width of opening (inches)
1/2 to 11/2	1/4
1-1/2 to 2-1/2	3/8

2-1/2 to 3-1/2	1/2
3-1/2 to 5-1/2	5/8
5-1/2 to 6-1/2	3/4
6-1/2 to 7-1/2	7/8
7-1/2 to 12-1/2	1-1/4
12-1/2 to 15-1/2	1-1/2
15-1/2 to 17-1/2	1-7/8
17-1/2 to 31-1/2	2-1/8

This table shows the distances that guards shall be positioned from the danger line in accordance with the required openings. See OSHA #29 CFR 1910.217 for complete details.

If the press is hand fed a fixed barrier guard will not work and the choices follow:

2 hand trip located at appropriate safety distance (location of the two hand control to the nearest point of operation). Safety distance = $63''/\text{second}$ hand speed constant x the time required for $1\frac{1}{2}$ revolutions of the crankshaft (more complex formula applies to clutches with multiple engagements. For example: press speed = 60 spm with 1 engagement point on the clutch = safety distance of 94.5"! Typical control retrofit packages costs approximately \$5,000.



Type A sliding barrier device. This device typically employs a gravity drop barrier guard with an air cylinder return. When an operator initiates a stroke the barrier drops into place preventing access to the point of operation then the barrier device starts the stroke. The barrier remains closed throughout the stroke and the air cylinder opens it at TDC. Typically these devices are expensive and maintenance intensive. Typical Type A sliding barrier devices start at \$3,000 and increase in price with press size.

Pullout or restraint. This approach uses nylon wristlets coupled to a post or mechanical device that either prevents the operator from reaching the point of operation or pulling he/she away from the point of operation as the die closes. They are moderately expensive and maintenance intensive. Further record keeping is involved. The device must be inspected and it's adjustment at each shift change, operator change, and die change. These systems limit mobility and many operators resist the idea of being tethered to a machine. Costs for these systems range from \$400 to \$3,000.



In reality a full revolution clutch may be appropriate for a simple automatic job; however, they are generally not effective for hand fed operations. Before an employer spends the necessary funds to make the full revolution clutch press comply alternate higher productivity solutions should be considered:

Hydraulic press: These presses can be equipped with a two hand control or used with a light curtain and foot switch. They are available in sizes from 1 tons to several thousand tons. They are safe for hands in die operations and since they stop quickly a two hand control can be used as a point of operation safeguarding device. They provide full tonnage throughout the stroke. They also feature adjustable strokes and can be fitted with other productivity features. Single stroke speeds are generally limited to <20 spm. A typical 3 ton bench press starts at about \$7,000.



Air over oil hydraulic presses. These “cylinders” can be purchased configured as a press with a two hand control. If the job involves piercing, joining, coining, etc. and the load is fairly balanced these presses are an attractive affordable alternative. Tonnages are available up to 70 tons rated over ½” while total stroke is usually 6”.



Pneumatic presses. Like the hydraulic presses these machines can easily be used with a two hand control. They lack the tonnage and control features of their hydraulic counterparts.

For more information on how to guard your presses and comply with OSHA and ANSI standards contact Production Resources, Inc. (800)863-3164 or e-mail us at lcp@pri-mailbox.com.

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