

## **Brake Monitoring/Inspection and Record Keeping**

### **[1910.217]**

The following is a summary of the OSHA regulations as they pertain to brake monitoring on a stamping press, and in particular, as they relate to testing and record keeping for stop times on stamping presses. We hope the following analysis will lead to better understanding of the requirements.

#### **A) TESTING AND INSPECTION REQUIREMENTS**

The section that specifically refers to inspection and record keeping is as follows: [all regulations cited herein were taken from OSHA's web site, with emphasis added.]

Inspection, maintenance, and modification of presses -

1910.217(e)(1)

Inspection and maintenance records.

1910.217(e)(1)(i)

It shall be the responsibility of the employer to establish and follow a program of periodic and regular inspections of his power presses to ensure that all their parts, auxiliary equipment, and safeguards are in a safe operating condition and adjustment. The employer shall maintain a certification record of inspections which includes the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, of the power press that was inspected.

1910.217(e)(1)(ii)

Each press shall be inspected and tested no less than weekly to determine the condition of the clutch/brake mechanism, antirepeat feature and single stroke mechanism. Necessary maintenance or repair or both shall be performed and completed before the press is operated. These requirements do not apply to those presses which comply with paragraphs (b) (13) and (14) of this section. The employer shall maintain a certification record of inspections, tests and maintenance work which includes the date of the inspection, test or maintenance; the signature of the person who performed the inspection, test, or maintenance; and the serial number or other identifier of the press that was inspected, tested or maintained.

1910.217(e)(1)(i)

Inspections must be both 'periodic and regular.' While the period is not specified in this section, the use of the term 'regular' suggests frequent inspections. The regulation is clear that the inspector must document a

number of key items. Note that this clause addresses ‘inspections,’ but does not mention testing of any kind.

#### 1910.217(e)(1)(ii)

This section indicates that inspection and testing are required at least once per week. Note that in this section, testing is specifically mentioned, and that both inspection and testing are required – not one or the other. The condition of the clutch/brake mechanism must be tested weekly.

While not specifically mentioning a stop test, it is hard to imagine a better way for testing the condition of the clutch/brake. A brake monitor is also not specifically mentioned, however, performing a stop test without the accuracy of the brake monitoring device, would provide little information of value.

Although these two sections taken together are a little imprecise, it seems clear that weekly testing of the clutch/brake is required. Measuring stopping times requires millisecond accuracy, which makes the use of a brake monitor essential. As always when dealing with OSHA, documentation is required as proof that the tests and inspections have been completed as required.

In section 1910.217(e)(1)(ii) there is an exception to these rules for presses that fall under paragraph (b)(13) and (14). This exception is for presses that have a control reliable clutch/brake controller and a brake monitor that measures every stop time [more on this below.]

## B) PRESSES WITH HAND OPERATIONS

Where the press operator is required to hand feed the press, or remove parts by hand, then special rules apply.

### 1910.217(c)(5)

Additional requirements for safe-guarding. Where the operator feeds or removes parts by placing one or both hands in the point of operation, and a two hand control, presence sensing device, Type B gate or movable barrier (on a part revolution clutch) is used for safeguarding:

### 1910.217(c)(5)(i)

The employer shall use a control system and a brake monitor which complies with paragraphs (b)(13) and (14) of this section;

### 1910.217(c)(5)(ii)

The exception in paragraph (b) (7)(v)(d) of this section for two hand controls manufactured and installed before August 31, 1971 is not applicable under this paragraph (c)(5);

**1910.217(c)(5)(iii)**

The control of air clutch machines shall be designed to prevent a significant increase in the normal stopping time due to a failure within the operating valve mechanism, and to inhibit further operation if such failure does occur, where a part revolution clutch is employed. The exception in paragraph (b)(7)(xi) of this section for controls manufactured and installed before August 31, 1971, is not applicable under this paragraph (c)(5).

If the operator hand feeds or removes materials, and if a light curtain, or other listed safety device, is used to protect the operator, then, according to 1910.217(c)(5)(i), you must comply with paragraph (b)(13) and (14). Paragraph (b)(13) addresses the control reliability of the press control, and paragraph (b)(14) deals with the brake monitor [covered below.]

Note that in 1910.217(c)(5)(i) it says that the employer shall use ... a brake monitor. There is no option. A brake monitor is required. In the event the press has hand work, the press needs a control reliable clutch/brake control, and it needs a brake monitor

## **C) CHARACTERISTICS OF A BRAKE MONITOR**

Regulation section 1910.217(b)(14) describes the actual requirements of the brake monitor.

**1910.217(b)(14)**

Brake system monitoring. When required by paragraph (c)(5) of this section, the brake monitor shall meet the following requirements:

**.. 1910.217(b)(14)(i)**

**1910.217(b)(14)(i)**

Be so constructed as to automatically prevent the activation of a successive stroke if the stopping time or braking distance deteriorates to a point where the safety distance being utilized does not meet the requirements set forth in paragraph (c)(3)(iii)(e) or (c)(3)(vii)(c) of this section. The brake monitor used with the Type B gate or movable barrier device shall be installed in a manner to detect slide top-stop overrun beyond the normal limit reasonably established by the employer.

**1910.217(b)(14)(ii)**

Be installed on a press such that it indicates when the performance of the braking system has deteriorated to the extent described in paragraph (b)(14)(i) of this section; and

1910.217(b)(14)(iii)

Be constructed and installed in a manner to monitor brake system performance on each stroke.

The brake monitor must be designed to prevent a successive stroke of the press, in the event that the safe stopping time is exceeded. Note that in 1910.217(b)(14)(iii) it explicitly states that you must monitor brake system performance on each stroke. There seems to be no ambivalence in this wording. If you are feeding or removing material by hand, relying on a light curtain or other safety device for operator protection, then you must have a brake monitor checking the stopping time on each stroke of the press.

#### **D) CALCULATING ALLOWABLE STOPPING TIME**

The allowable stopping time is not a fixed interval. The allowable stopping time must be calculated. The stopping time allowed depends on the safety distance. [The shorter the distance, the shorter the allowed stopping time, and visa versa - i.e. the farther the light curtain is from the hazardous area of the press, the greater the allowable stopping time.]

The relationship between stopping time and safety distance is set forth below.

1910.217(c)(3)(iii)(e)

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 deg.  
position of crankshaft rotation (seconds).

Note that the stopping time for purposes of this calculation is measured at 90 degrees.

#### **E) SUMMARY**

The above covers the relevant regulations relating to brake monitoring. Taken together, it indicates that a dedicated brake monitor is required on a

press where there is hand feeding or part removal taking place. In cases where no hand work is being done, a weekly brake test, with proper documentation, can suffice.

What seems less clear is what type of testing and documentation is required in the case where a brake monitor is permanently used on a press. It appears that in this case the company is exempted from record keeping, although documentation is always a plus when dealing with OSHA, and since the brake monitor is so readily available, doing a weekly test, with documentation, would be easy and worthwhile.

As always, the stamping company is ultimately responsible for the safety of its employees and for insuring compliance with OSHA regulations. The preceding is simply our understanding and interpretation of the requirements.

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July 30, 2008