

## Three Roll Benders

## Detail Sheets

Three Roll-Benders (aka roll formers) are self-contained machines normally consisting of a base, chassis, stand, transmission drive, electrical system, dies or rolls which are capable of producing a bend across the width of flat or preformed material by means of one or more rotating dies or rolls and other tooling to achieve a predetermined configuration. These are machines that primarily perform metal bending, rolling, or shaping functions. Roll bending machines produce a bend across the width of flat or preformed metal to achieve a curved or angular configuration. The machines frequently are set up and operated by one person.

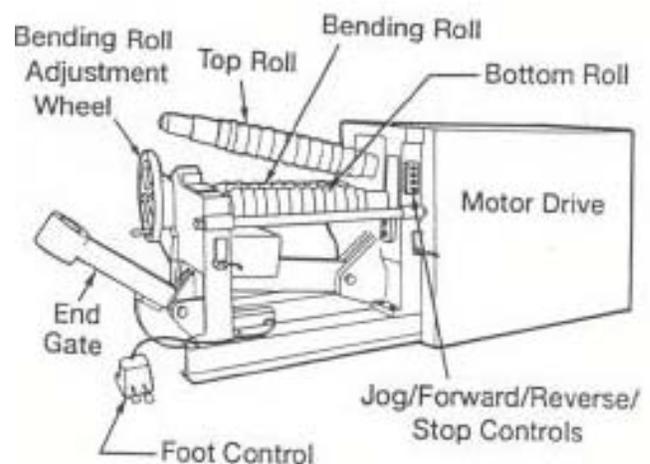
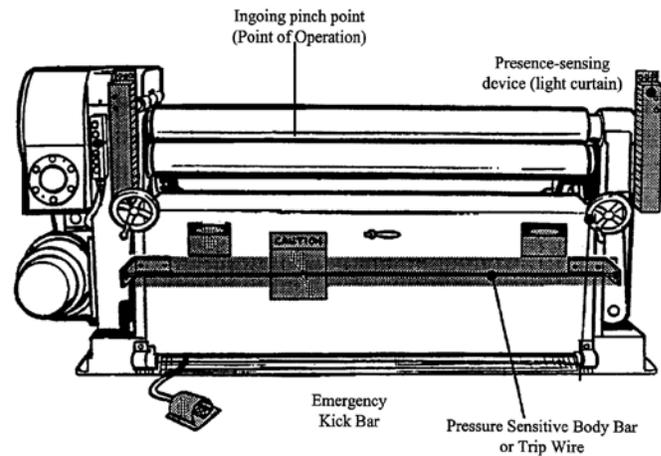
**Operator Involvement:** It is normally the operator's responsibility to set up the machine and dies, load the stock, operate and unload the formed part. Semi-automatic and manual machines require the operator to manipulate the stock during the forming cycle to guarantee a finished part that is dimensionally correct.

**Hazards:** The most common type of amputation hazard associated with roll bending machines are point of operation hazards created by the in-running nip points. Amputations occur when the hands of the operator feeding material through the rolls get caught and are then pulled into the point of operations. Amputations related to roll form can occur from the following: pinch point hazard beneath barrier guard; impact hazards when the leading edge of the part contacts the top of the barrier; drag-in hazards when part is formed.

**Machines:** Roll forming and roll bending machines are available in a wide variety of sizes and designs.

Safeguarding must be tailored for each machine, considering factors such as machine size, operating speed, thickness of product, length of production runs, required production accuracy, how material is fed into the machine, and part removal methods.

Depending on the operation, it may be possible to install fixed guards at the infeed and outfeed sections of machines. There is no universal method of safeguarding the point of operation for general-purpose roll benders (for example, roll bending operation producing a full circle with or without overlap). The guard can actually become an amputation hazard. See the article on three roll benders at [www.triodyne.com](http://www.triodyne.com).



### Case Study

An employee wearing gloves caught his left hand in a roll forming machine, resulting in partial amputation of two fingers. The employee was standing close to the moving rollers, feeding flat steel sheet from behind and catching it on the front side. There was no point of operation guard on the front roller and the foot operating pedal was very close to the machine.

**References:** OSHA 29 CFR 1910.212(a)(1); ANSI B11.12; See also [www.triodyne.com](http://www.triodyne.com)

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Consider installing fixed point of operation safeguards to cover the sides of the rollers to prevent an employee from reaching into the ingoing nip points of the rollers.

Install fixed or interlocked guards to cover any other rotating parts, such as a power transmission apparatus.

Install safety trip controls, such as a pressure-sensitive body bar or safety tripwire cable on the infeed section of the machine to shut down the machine if an employee gets too close to the point of operation.

### **Safer Work Practices:**

- Locate foot pedal controls away from the point of operation and guard them to prevent inadvertent activation by falling objects or accidental stepping onto the pedal.
- A marked main power disconnect switch capable of being locked only in the "off" position.
- Provide a magnetic motor starter
- Do not use the roll and material release mechanisms found on many roll benders (feature of an emergency stop) as a safeguarding device.
- Ensure that operators use the jog mode during feeding operations if appropriate; and that they maintain a safe distance from the machine's rollers.
- Develop and implement safe operating procedures for roll-forming and roll-bending machines and conduct periodic inspections of the operation to ensure compliance.
- Ensure that all operators receive appropriate on-the-job training under direct supervision of experienced operators until they can work safely on their own.

The number of accidents and the circumstances in which they occur show that most can be avoided by a knowledge of the risks and by adopting safety measures. The simple safety steps given below will help to prevent most accidents at grinding machines. You may find them useful as a safety check list.