

Removing piece parts from dies in mechanical power presses

Experience indicates that a large percentage of injuries to power press operators and helpers occur during the removal of piece parts. The most common types of injuries include puncture wounds, lacerations, strains, and crushing of the hands and feet.

2. This data sheet discusses both automatic and manual removal and handling of piece parts and describes ways in which the hazards involved can be controlled.

3. This data sheet does not cover required point-of-operation safeguarding, which is explained in other data sheets.

Automatic removal of parts

4. First consideration for removal of piece parts should be given to using automatic means (Figure 1). This method is generally the most efficient and least costly when considered at the time of die design. With elimination of the need for manual removal

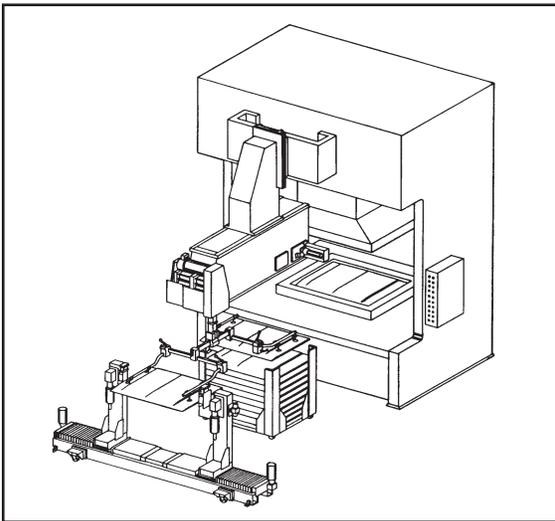


Figure 1. This illustrates the mechanized unloader removing a finished part from the die area.

of parts, the operator can concentrate on other tasks, resulting in less exposure to die hazards and would therefore be less likely to become fatigued.

5. Usually, automatic removal of piece parts is a two-stage process requiring: first, stripping of the part from the die and, secondly, conveying of the part from the press. This process can be accomplished in many ways. In some cases, a single mechanical means performs both stages. In other cases, a separate method is used for each stage.

6. Some of the more common methods that are used alone or in combination to strip piece parts from the die are:

- Positive stripper plates (see Figure 2-A);
- Spring pressure pads or pins (see Figure 2-B);
- Latch-type mechanical lift dogs (see Figure 2-C);
- Compressed air jets (see Figure 2-D);
- Pneumatic or hydraulic lift pins or pickup fingers (see Figure 2-E).

7. Single or multiple air jets can be used for effective removal of small piece parts. Air ejection can also be combined with other mechanical release means or with gravity removal. All air jets should be anchored securely to direct the air stream effectively and to prevent the jet tubes from shifting into the die working area. Both the consumption of air and the production of noise can be reduced considerably by incorporation of one or more of the following suggestions:

- Locate the jet discharge as close as possible to the piece to be removed. Optimum positioning is essential for maximum effectiveness and frequently can be accomplished through die design.

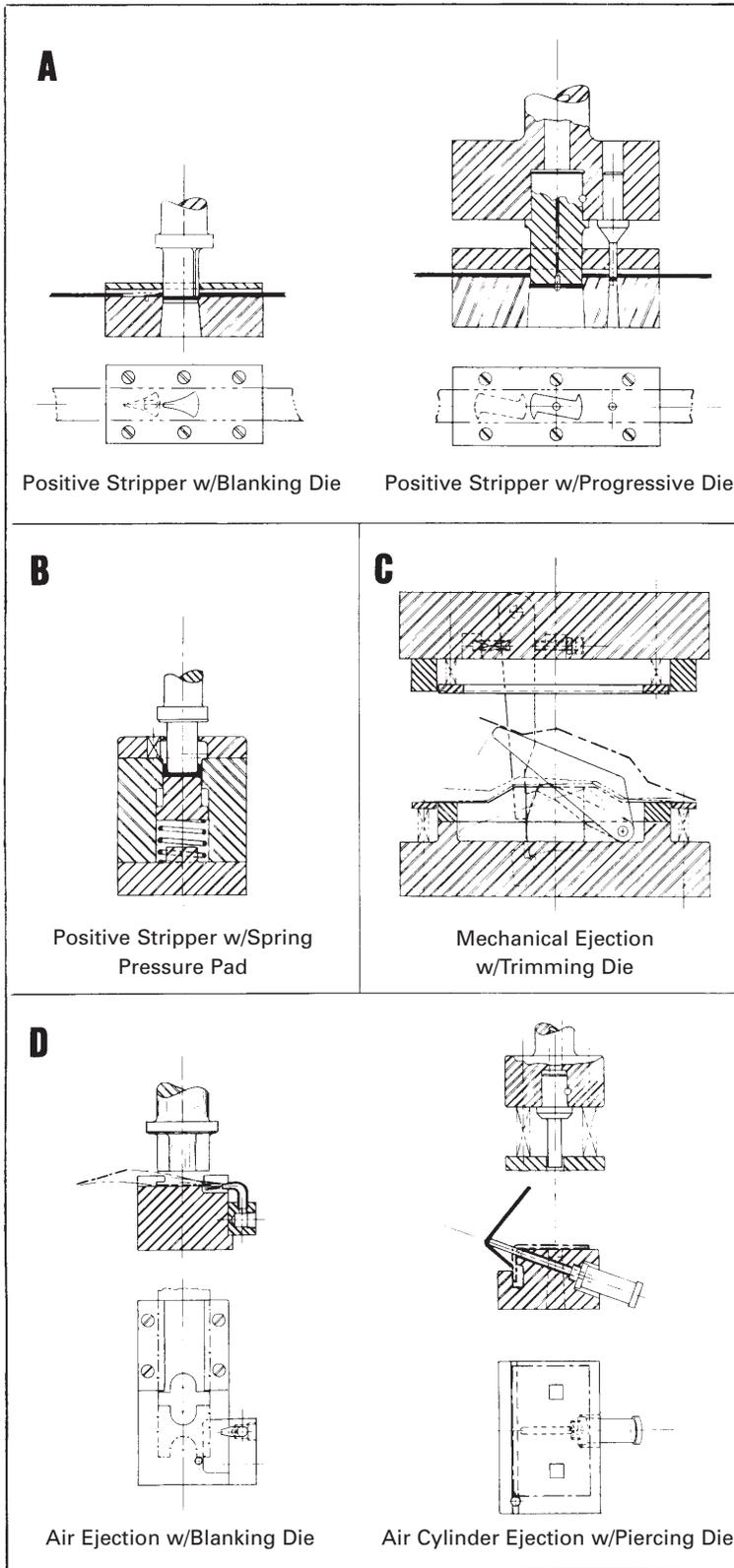


Figure 2. This illustrates mechanical methods for stripping finished pieces from power press dies.

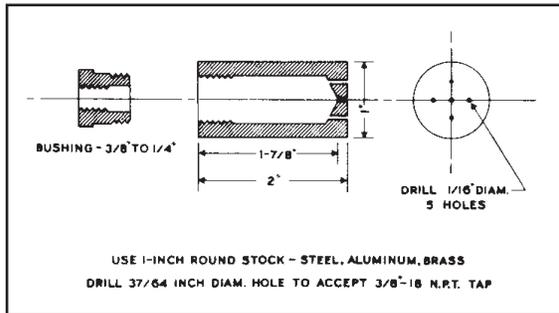


Figure 3. A multi-orifice air ejector nozzle designed for noise reduction.

- b. Limit the duration of air discharge to the minimum period required to remove the piece.
 - c. Reduce the discharge pressure to the minimum required by means of flow valves or pressure regulators.
 - d. Use an air ejector nozzle with several orifices (see Figure 2-D).
- 8.** Pneumatic cylinder operating sweeps, lifters, or kickout pins, timed with the upstroke of the press, are more effective than air jets for removal of large and heavy pieces. Such pneumatic equipment should include a valve arrangement to shut off the air and exhaust any residual air pressure between valve and cylinders to prevent unintended motion (see Figure 2-E).
- 9.** Extractors are either actuated mechanically by connection with the press slide or power take off shafting, or are independently powered.
- 10.** Independently powered extractors are frequently used because they are versatile and can easily be moved to, and used with, another press. They should be interlocked with the press control circuit so that the press cycle cannot be initiated unless the extractor is in the "home" or "out" position. The equipment manufacturer's recommendation should be considered before any interlocking into the press control cir-

cuitry is attempted.

11. Chutes generally are provided to guide ejected parts into a collection container. Chutes or slides can also be used to control movement of pieces to subsequent operations. Chutes should be designed to prevent a parts pile up back into the die. Noise reduction should be considered in chute design. Access to any hazard in the area of the chute opening should also be reviewed for compliance with OSHA Table O-10 in Title 29 CFR Section 1910.217.

12. Conveyors can be used to transport piece parts to containers or to subsequent press operations. All conveyors should be constructed or supported so as to be stable, and they should not be or create a hazard in themselves (see Figure 5). Conveyor sections, especially those of the gravity type (e.g. inclined roller skate wheels), should be adjustable so that angles of slope can be set as the primary or auxiliary factor to control movement of parts at safe speeds and with orderly spacing.

Manual removal of parts

13. Where manual piece part removal from the die area is necessary, every effort should be made to eliminate the need for placing the hands in the hazardous area. The die design should permit the use of hand tools in removing piece parts.

14. Hand tools should be made of aluminum or other light-weight ductile material. Some examples are hooks, bars, pliers, paddles, tweezers, vacuum cups, or magnetic pickups. They should be stored away from the press in an organized manner so that tools of the desired type and shape can be located easily (see Figure 4). Where hand tools are necessary to keep the hands out of the hazardous areas of the die, their application and use should be strictly enforced.

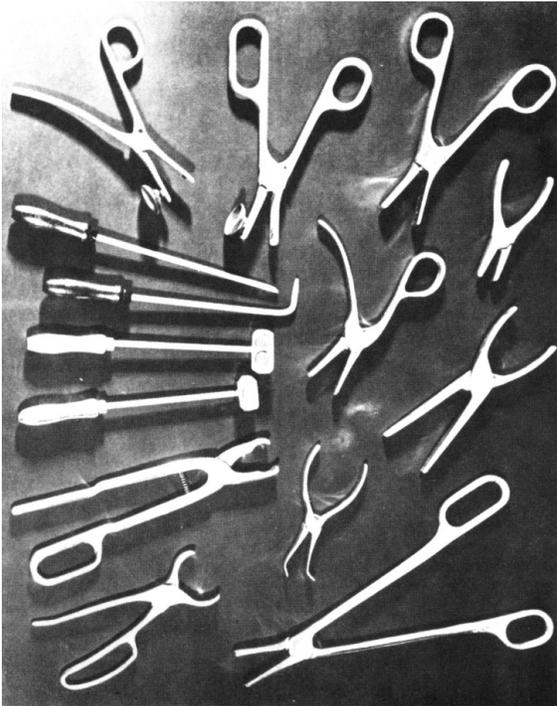


Figure 4. Typical hand feeding tools that are used for loading and unloading.

(Photo courtesy of Garber Manufacturing Co.)

Sources of information

American National Standards Institute, 1430 Broadway, New York, NY 10017. ANSI 11.1-18.

National Safety Council, 1121 Spring Lake Rd., Itasca, IL, 60143. *Power Press Safety Manual*, 4th Edition, 1989.

Accident Prevention Manual for Industrial Operations, 9th Edition, 1988.

Data Sheet I-716, "Set Up and Removal of Forging Hammer Dies."

U.S. Department of Labor, Occupational Safety and Health Administration, 3rd and Constitution Avenue, NW, Washington, DC 20210.

Title 29 CFR, Section 1910.217.

Acknowledgment

This data sheet was revised by the Power

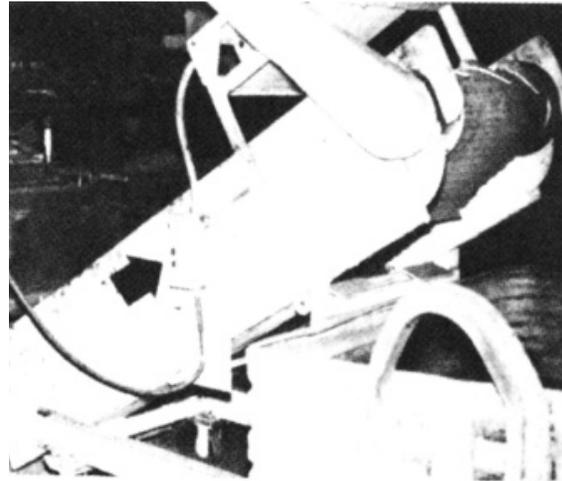


Figure 5. This shows how a mobile belt conveyor receives parts stripped from the die at the left and transfers them to the parts container on the right. The arrow indicates "on/off" controls.

Press, Forging and Metal Fabricating Section of the Business & Industry Division, National Safety Council, 1121 Spring Lake Road, Itasca, IL 60143.

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