

HOT WORKING OF METALS

omy. Worn piston sleeves and sloppy linkage make the hammer hard to control and create a hazard. Loose cylinder heads also are dangerous.

Frequent periodic inspection of every forging hammer will help ensure proper condition of all bolts, screws, keys, valves, and other parts which may be loosened by vibration. Similarly, thorough periodic inspection and adjustment should be made of all parts of the treadle or pedal, clutch, and other operating mechanisms.

Worn or loose treadle linkage, motion arm, crank arm, and treadle can cause the hammer to go out of control. These parts especially should be kept in good repair.

The clutch is a vital part of the forging press and must be kept in good condition if the press is to operate satisfactorily. A broken spring or part which shows wear should be replaced at once.

Lead casts

Lead casts are taken in practically every conceivable manner in the forging industry. Casts should be taken only in an isolated area, if possible, where there is no likelihood of interference from or injury to other workers. The die impressions should be dry since hot metal that contacts water produces flying particles of molten metal.

Lead pots should be ventilated to the outside of the building.

Forging Upsetters

The upsetter is a horizontal forging machine which forges hot bar stock, usually round, into a great many forms by a squeezing action instead of impact blows, as in the case of forging hammers. Although numerous hazards are involved in the operation of an upsetter, the most serious problems are encountered in changing the dies.

The entire machine should be completely enclosed, except for the feed area. Heavy wire mesh or expanded or sheet metal reinforced with structural steel should be used. Doors may be cut into the enclosure for servicing flywheel, brake, and other moving parts. A guard should be installed over the operating pedal.

Safe operating conditions call for the area around the machine to be clean and clear of obstructions and litter. It is especially important that the top of the machine be clear

of any objects, such as loose bolts, bars, nuts, or shims, which might fall into it or from it.

The operator should shut off the power, lock the main power switch, and immobilize the flywheel before attempting to adjust dies, heading tools, stock gauges, or backstops.

Design of dies

Dies and heading tools used in an upsetter or horizontal forging machine are not usually subjected to such severe abuse as are hammer dies. A good grade of chrome, nickel, or molybdenum steel of the correct hardness is recommended for gripper dies.

It is common practice in die shops when resinking upset dies to use inserts rather than to cut down the dies. The inserts most commonly used are made of a high chrome, nickel, or molybdenum steel with silicon added.

Tool steels with a vanadium and tungsten analysis are also used for inserts and headers, but they must be selected to satisfy operating conditions because of their limited use where coolants are employed.

Front or back stock gauges or backstops should be designed and located to serve the specific purpose and should not be a handicap to the operator. Special care should be taken to eliminate all hazards, especially pinch points.

Jobs which are abnormally heavy or which would create an unbalanced condition when running should be designed to employ balancing equipment to facilitate handling and reduce operator fatigue. The grip sometimes provided on upset die impressions should be sufficient to hold the stock securely, and should be checked after every run. This precaution is important for the operator's safety, especially on jobs where the heading tool could push the stock bar out of the impression toward the operator.

Setup and removal of dies

At the end of a run and before further work is done, all skids of stock or forgings should be moved out of the area to allow as much room as possible when the dies are changed.

Die setters should not try to make a complete setup dimensionally by measuring headers, strokes, and dies, without inching