

33—Hot Working of Metals

ing 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.

STEAM HAMMER MAINTENANCE CHECK			
Date	Hammer No.	Location	
ITEM CHECKED	CONDITION	TYPE OF REPAIR	EST. HRS. TO REPAIR
CYL. HEAD BOLTS			
MOTION VALVE STEM			
MOTION VALVE CRANK			
MOTION VALVE CONNECT			
WIPER BAR & CRANK			
THROTTLE CRANK			
THROTTLE LINKAGE			
RAM & SOW BLOCK			
DIE KEYS & SHIMS			
SOW BLOCK KEYS & SHIMS			
GUIDE BOLTS			
GUIDE WEAR			
GUIDE ADJUSTING BOLTS			
GUIDE WEDGE POSITION			
HOLDING BOLTS & SPRINGS			
TREADLE			
TIE PLATE LINER			
PISTON ROD GLAND PLATE			
GLAND BOLTS			
TREADLE PLATFORM			
STEAM CUSHION LINE			
SCALE HOSE			
SAFETY LINER			
SAFETY PROP			
STEAM LINES			
STEAM SHUTOFF VALVES			
REACH ROD			
COLUMNS FLAT ON BASE			
COLUMN WEDGES & BOLTS			
SPOOL BOLT & PIN			
SAFETY CABLES			
CRACKS IN BASE			
REMARKS			

FIG 33-25—Maintenance checklist for steam hammers

The operator should shut off the power, lock the main power switch, and immobilize the flywheel before attempting to adjust dies, heading tools, stock gages, 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 re-sinking 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