

Hot Working of Metals

ing area. The scale guard should be moved back, and accumulated scale that would interfere with safe footing should be removed. Forgings should be moved away from the unit immediately and sent to the next work station.

If another set of forging equipment has been delivered, it should be placed nearby but not directly in the area where the hammer crew will work. Service personnel, such as truckers, crane men, and hookers, should be familiar with the proper procedure so that unnecessary handling can be eliminated.

The hammer's main power switch or control must be shut off and locked before the die keys are loosened. The top key is generally loosened first, usually with a mounted pneumatic ram (Fig 28-18). A light, well balanced ram suspended from a cross beam or from an overhead crane or chain fall can also be used successfully.

Using a manually held drift pin or a knockout on a die key after it has been loosened and driven to a position even with the face of the ram or the sow block is a hazardous operation. A special type of adjustable knockout (Fig 28-23) that is held in position mechanically rather than manually should be used.

After the die keys have been driven out, the ram should be raised and propped at once. The prop must be in good condition and must be placed on a clean surface. On a gravity drop hammer, a jack should be used and a special prop may be required.

No attempt should be made to raise the hammer to propping level if the top die has a tendency to "hang." The die should be freed first within the shortest possible distance from the face of the bottom die. The ram on an air drop hammer should be propped with special care. After the prop is positioned securely under the ram, the power should be shut off and locked out.

Dies can be removed from the hammer by means of special die chains suspended from an overhead crane or chain fall. Special platform trucks with winches are also employed for this operation. They are practical and safe because the dies are winched out or pulled out horizontally directly onto the table of the truck. Dumping the dies out of the hammer onto the floor should not be

permitted.

After the dies have been removed from the hammer, the dowels must be extracted. It is important that the two men who drive out the dowels have proper tools, usually a drift and a sledge. These tools should be in good condition and have sound handles. Because there is metal-to-metal contact, the men must be extremely careful.

After being removed, dies should be loaded on low steel pallets and taken from the vicinity as soon as possible. If dies need repair or modification, the hammer man should notify his foreman. The foreman can then send this information to the die servicing department so that the condition can be remedied before the next run.

Design of dies

Hammer dies are usually made of chrome, nickel, or molybdenum steels—materials which have high resistance to heat, shock, and abrasion. Die blocks are supplied commercially in four different hardnesses. Selection of the proper die steel in the correct range of hardness is of utmost importance in controlling checking and breakage of dies.

Size, amount of striking surface, and height are all pertinent factors in the safe design of dies.

The correct amount of striking surface must be allowed in relation to the size of the die. Too little striking surface may cause breakage or an undersized forging when the dies pound down. Too much striking surface, especially if it is unbalanced, may cause a pull or misalignment.

Correct die height must be specified, especially for resinking forge dies. Normal work level should be maintained for the benefit of the hammer man, and the height should never be below a specified minimum, to prevent the bottom of the cylinder from being knocked out. Maximum and minimum operating heights should be labeled on each unit for use by the design engineer.

The dies must be made so that they meet in precise alignment. Layout of the dies should provide for the major portion of the heavy forge work to be done in the center of the die under the center of the ram, where the maximum hammer force is transmitted. Each impression in the die must be backed up with enough die material to reduce the