

## 2.15 AN AUTOMATIC LUBRICATION SYSTEM FOR THE EXTRUSION CHAMBER OF BRASS BILLETS



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#### Issue

Metal works sector. Substitution with boron nitride powder and automation to avoid exposure to talcum powder used as a lubricant.

#### Problem

In an extrusion chamber, a brass billet is heated and transformed into a bar. High forces and temperatures are involved in this process that can affect the behaviour of the press. One problem involved the shell of the billet becoming attached to the wall of the exclusion chamber after extrusion had ended, due to the enormous cohesion forces between the billet and the chamber. When this happened, an operator had to enter and remove the billet. The unacceptable hazards of this operation included exposure to high temperatures and injury from moving components of the press. To solve the problem of the sticking billets, industrial talcum powder was applied as a lubricant to the billets before they entered the extrusion chamber. However, the operator had to apply the talcum powder to the hot billet while the billet was being automatically loaded into the extrusion chamber. The operator had to be inside the moving component area of the press seconds before the beginning of the cycle and due to the high temperature of the billet, the talcum powder formed a cloud and was widely dispersed across the whole area. Although masks were used, after only four to five cycles the filters were clogged.

#### Solution

It was decided to substitute the talcum powder with a safer product, powdered boron nitride, which could be electrostatically discharged when sprayed.

Tests showed that the boron nitride powder was effective in preventing the billets sticking to the chamber wall. Next, an electronically controlled spraying unit (as used in electrostatic dyeing) was purchased that electrostatically charged the powder when spraying it, so that it would adhere to the nearest metallic parts of the press (i.e. the stainless steel extrusion chamber) and not be dispersed into the environment.

The automation also included mechanical and hydraulics designs so as to determine the best possible position where the whole system should be installed.



The spraying nozzle was brought as close as possible to the extrusion chamber by installing the automated system on the outer section of the extrusion chamber. From there, aided by a hydraulic piston, the spray nozzle was brought to within 3 mm of the extrusion chamber, thus facilitating the adherence of the boron nitride powder to only the inner section of the extrusion chamber.

## Results

The lubrication is done automatically, avoiding operator exposure. Others in the factory area are no longer exposed to talcum powder. Improved lubrication has improved the machine life and reduced maintenance costs and automation has also reduced the press cycle, increasing productivity.

## Comments

While eliminating one problem, a new hazard was created, that then required assessment and prevention.

