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ARE WE MOVING INTO A NEW FORMAT PEENING & BLASTING MACHINE?

By Ronald John
Tealgate Ltd., England

THAT WAS THEN...

Traditionally, blast machines have consisted of a pressure pot with some form of restricted opening through which the shot or grit passes into the blast hose. The opening had to be relatively small so that 'some-where' near the correct amount of material passed into the system. Also a pressure differential had to be created between the pot and mixer to compensate for the uncertainty of transfer by gravity. The pressure differential forced material through the restricted opening; unfortunately, this had certain draw-backs.

1) The media feed rate was dependent upon the pressure differential existing between the pot and the mixer. If the blast pressure was increased, then the media feed rate increased. Unfortunately, the resulting increase in feed rate is not predictable.

2) Forcing a very abrasive media through a restricted orifice causes wear to the orifice. Over a time the opening increases, so the feed rate increases, again unpredictably.

3) Because the media is forced through the orifice it will have a high tangential velocity (relative to the blast hose). This will decay as the media ricochet causes severe wear at the entry port and down the hose.

4) The media feed rate is relatively unpredictable at any time, and the only method of determining the actual feed rate is a "catch & weigh" test, but this would only apply for the set of conditions under which the test was conducted.

THIS IS NOW...

The advent of two new methods of controlling the feed rate of peening and blasting media have changed the thinking on the design of such machines. There are two such basic devices, each with variations in capacity and application. Both the devices, one for ferrous media and the other for non-ferrous media, have relatively unrestricted openings and do not use a restricted orifice to control the feed; they use a radically different method of control.

The MagnaValve

The maximum throat opening of the valve represents the maximum feed rate. The opening through which the media may pass is not physically changed. What controls the feed rate is the number of times per second that media is allowed to pass. The MagnaValve has a powerful permanent magnet that straddles the media path. Fitted to the pole pieces of the magnet are controlled electro-magnets. When the electromagnets are switched on the permanent magnet effect is canceled, thus allowing media to pass through. The feed rate of media is then controlled by the switching of the electromagnet in a pulsed "duty cycle", so that media falls through the full opening for a controlled time to provide a controlled feed. The frequency of the "duty cycle" determines the feed rate; if the electromagnetic effect is 'off' all the time then the valve is closed; if it is 'on' all the time then the valve is fully open. The MagnaValve incorporates a flow monitor with feed-back control of the feed rate. This makes it a very efficient and reliable feed control valve for steel shot or grit. Because a pressure differential is not necessary to force the media through the valve then the other harmful effects of changes in the blast pressure, which changes the pressure differential, can be removed. High pressure differentials have an effect on the flow velocity through the valve. High velocity means wear, so it is better avoided.

The PreciFeed

This type of feeder also offers the full opening for unrestrained media passage. The control of the feed rate uses the natural gravitational effects of the media to feed to a specially shaped mini-conveyor. The feed rate is then exactly proportional to the speed of the belt. With this type of feeder a pressure differential is not only unnecessary, it is to be avoided. The operation the feeder is so gentle and considerate of the media that a positive pressure differential will flood the feeder, and a negative pressure differential will cause light media to hold up and not pass into the feeder.

Since a pressure differential is unnecessary when using the MagnaValve, and undesirable when using the PreciFeed, a control system for blast machines that eliminates the pressure differential becomes necessary. Examining the problem was a task of serendipity.

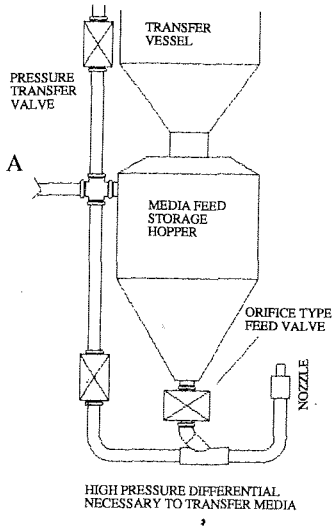

FIGURE 1

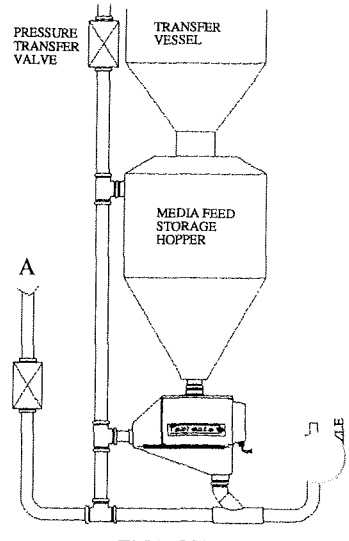

FIGURE 2