

The Selection of Grinding Media

One of the highest cost consumables in the operation of a Mineral Processing plant is the Grinding Media, consumed in the various types of mills utilised for feed or size reduction. To most existing operations and consultants planning the flow charts of new installations, the media is seen as a necessary commodity that can be met by either forged balls or cast High Chrome products. Unaware of a proven low cost alternative!

The manufacturing process of similar types of grinding media is a major factor. The process of forging balls is similar throughout the world, certain costs have to be accepted regardless of the country of origin, effecting the selling price of the product.

In recent times, the existence of a quality low cost alternative has allowed metallurgists to make use of smaller media, without the higher pricing automatically linked to the supply of small balls typically used in regrind mills.

Why should we use smaller media for secondary and regrind mills?

A high percentage of grinding action in a ball mill relies upon friction, being the contact of

mill feed or with the grinding media surface. To optimise mill performance, the grinding media surface area should be as large as possible, with the media retaining sufficient mass to accommodate the incoming feed characteristics. Net result an increase in throughput or a finer end product.

We obtain that increase in surface area by using smaller grinding media!

The energy consumption will drop while the throughput increases due to the smaller media. The mass of the charge and therefore the energy input stays constant.

By retaining a constant mass of the charge and reducing the media size, we obtain higher throughput [t/h]! For the same energy input, this translates to a reduction in specific energy [KWh/t].

To make a significant impact upon media costs, it is essential to find a lower cost method of manufacture. Without that breakthrough, cost of locally produced and imported balls will not vary too much, with quality and support issues determining the ultimate supplier.

The Selection of Grinding Media

The German company, DOERING International GmbH, is the leading supplier of such an alternative Grinding Media, in its range of cylindrical media known as Cylpebs.

Manufactured in metal moulds, the process aligns a „grown“ structure perpendicular to the working face of the media, giving the product amazing shape retention.

Operations currently using balls will be well aware that superior shape retention is a major advantage over the final 50% of media life, greatly improving grinding capacity.

A unique feature of Cylpeb manufacturing is the ability to supply a range of media at a single price structure. DOERING Cylpebs within the size range of 20 mm to 50 mm are available at the same price! Without being disadvantaged, metallurgists can make use of the incremental sizes available to optimise plant performance.

DOERING technical input controls the manufacturing process in selected foundries located in Germany and other countries

worldwide, the resulting high quality product rating as a proven cost effective grinding tool.

A ball has the smallest surface area relative to its weight! Cylpebs have a surface area advantage over balls of equal weight of 14.5 %, a bulk density of 4.9 t/m³ versus balls of 4.5 t/m³. Therefore a typical mill charge can obtain 25% more available grinding surface area, resulting in greater throughput and lower energy consumption.

You are invited to learn more about this range of media, with a proven capacity to reduce operating costs, by logging on to the DOERING International website.

The site has been developed to assist metallurgists to correctly size grinding media, utilising the most cost efficient product available on the market.

In addition to interesting technical data, the site incorporates the world renowned “Bond Formula“ in an interactive presentation. By inserting your milling operating parameters into the boxes provided, the optimum media

The Selection of Grinding Media

size as nominated by Bond will be given.

Required data to make use of this feature is as follows:

- F80 of the mill feed
- WI Bond work index of the feed (a listing of common indexes is provided on our website)
- Percentage of critical mill speed
- Specific gravity of mill feed
- Inside mill diameter
- Wet or Dry grinding process

Changing the input data to the boxes will enable technicians to check current media utilised, the effects of differing feed size and review possible alternatives.

For sites not having the necessary data to utilise the interactive size calculation, we refer you to the additional pages on our website, for more details on critical mill speed and SG of mill feed. We offer to calculate the F80 on presentation of sieve analysis of your mills.

To start your cost reduction programme, call up www.cylpebs.com and talk to us, we have a truly unique product that should be investigated for use on your site!

For communication, use the e-mails indicated on the website www.cylpebs.com or contact us by Telefax, DOERING International headquarters: **+49 (0) 2772 / 500-146.**