MGM-Group, Maxim Kuznetsov - Director

Today, the issue of intensifying the exploitation of concentrator equipment, and primarily of the ore grinding mills, is exceptionally significant. From one perspective, the increased price rate for basic precious and non-ferrous metals pushes equipment proprietors to increase the throughputs prior to the incursion of the second economical recession dip. From another, the decreased feedstock ore grades impose increased requirements to the performance of the existing stock of equipment.

In response to the time challenge, on the New 2013 Year eve, MGM-Group presents new services and technical solutions to its clients, allowing to maximize the efficient performance of the stock of equipment currently available today in the concentrator plants

1. Selecting Sets of Liners

NORDSIB company (resident of Akademgorodok, Novosibirsk) - the engineering partner of MGM-Group, has implemented a physical and computer-assisted methods of modeling solid particles motion inside a mill.

In the first case, the intra-mill solid motion is modeled in a unique “transparent” laboratory-scaled mill. Filling with corresponding material and grinding bodies is done to scale. The research results are recorded using a slow-motion camera.

In the second case, contemporary multiple-CPU computer technology fortified by a one-of-a-kind in Russia and CIS software allows to highly accurately predict the ballistics of the solid and the griding bodies within the mill.

The given systems allow to arrive at the optimal mill lining profile shape and to predict the operating life of the liner at the project design stage comparing it to the liner being used currently. Combining the physical and the computer-assisted modeling methods described herein, as well as the analyses of the grist and the actual liner lifetime allow to significantly reduce the liner wear, as well as increase the product grade performance by 5%.

Today such activities are carried out on various projects of OJSC Alrosa, UMMC Holding, Russian Copper Company, NORDGOLD, EVRAZ and other projects.

2. Design and supply of Specialized Mill Discharge Systems:

Physical modeling and computational methods are used to design discharge systems of wet-grinding mills/SAG mills. In this case, the primary objective is to reduce the amount of slurry recirculation in the undergrate array.
This method allows to compute the optimal opening and slot design of the discharge grate most accurately, furthermore, their positioning from the perspective of screening the desired product grade. In particular it was established that increasing the clear area of the screen does not directly correlate with grate throughput capacity, because there are blank zones in the mill, which do not allow to discharge the ground material, even if discharge slots are provided.

Furthermore, the method allows to analyze the various shapes of discharge lifters which directly affect the volume of return circulation of material from behind the grate back into the mill drum. To reduce the recirculation volumes, options of adopting either "broken line" lifter design or using multi-blade lifters.

The presumed efficiency of selecting the optimal discharge grates and lifters allows to increase the mill throughput capacity by 15...25% depending on the current parameters.

3. Supply of liner handlers and relining mechanical equipment:

One of the most efficient means of increasing the throughput capacity of concentrator equipment is the reduction of its downtime for maintenance and relining.

We can significantly reduce such relining downtime by applying special machinery and mechanical equipments. The following appear as the basic resource of down time reduction using specialized equipment:

- Reducing the bolt driving time and knocking out time of horned liner blocks using recoilless bolt driving hammers. This allows to reduce the relining time by approx. 10 - 20;

- Liner handlers for intra-mill load lifting works, which execute the removal of spent lining off the drum as well as repositioning of new liner in its designated spaces. Allows to execute lifting works mechanically without resort to manual labor, precisely positioning the liner blocks against mounting holes. Reduces the downtime by 50%.

Given that 5 years ago neither a single liner handler nor a bolt removal hammer were available in Russia or even in CIS countries, and most of the concentrator plants were serviced manually, today, the situation is changing drastically. Nowadays, almost every new concentrator plant project includes liner handlers with lifting capacity of 200 - 7000 t.

Now, 3-axis handlers and recoilless bolt removal hammers are efficiently used by such companies as UMMC, Russian Copper Company, NORDGOLD, Highland Gold Mining Ltd., UzhuralZoloto. World-class relining and mill servicing systems will be implemented in 2013 in the projects of Mikheevskiy GOK (Russian Copper Company), as well as Taldinskii deposits (Polyus Gold).

Regardless of the considerably high costs of own relining equipments, the ROI, generally comprises 1 - 2 years. If the mill operates with the equipment utilization rate of 0.75 - 0.8 , then the company loses up to 20% of achievable capacity. Which results in colossal losses – in the case when several mills are used.

MGM Group significantly facilitates the purchasing of such handling equipment – presenting the complete range of services of presales consulting and selecting of the equipment services, supply of Russel Mineral Equipment machinery – the worldwide leader in the field of relining.
4. Execution of relining activities in record-breaking specified time

World mill relining standards presume average time expenditures for one liner block not exceeding 6 minutes. Which, for example, means that relining the drum of an MMS 70x23 wet grinding mill should be executed within 24 hours. Complete relining and replacement of the discharge grate and lifters – within 72 hours. Such values are beyond the imagination for most post-soviet factories and plants.

They are, however, achieved by applying the aforementioned modern mill relining systems as well as by precisely managing the works and applying specific skills. Establishing such a precise work flow management system is often beyond the limits of large and world leading companies. For this reason, such works are outsourced to specialist companies.

The prerequisites for this are:

• Specialist company is solely focused on executing mill relining works. Dozens and hundreds relinings per annum. This allows to maintain the expertise at the highest level, and most of actions are executed "in autopilot mode".

• Such a company has specialized tools and small equipments – sometimes unique, allowing to resolve any kinds of non-standard issues.

• The team framework is comprised of unparalleled specialists demonstrating utmost mutual understanding.

• Purpose-designed personnel incentive program. The earlier a team completes its work on an object – the faster it may move on to the next one.

• High employee turnover rate in concentrator plants, virtually deprives the proprietors of the perspectives to develop his own relining team.

MGM Group in cooperation with Miltrac (Ghana) executed an agreement to establish a first-of-a-kind joint venture in Russia, to deliver relining services according to world class standards with respect to time and safety of works. In 2013 relining is expected to be executed in over 10 mills with drum diameter ranging from 3.2 to 12 m in Russia, CIS and Mongolia. If at the first stage the works are presumed to be executed by a joint team with the participation of African specialists on key positions, in the subsequent 3-4 years, this service shall be completely localized in Russia and CIS.

This service allows for a significant risk mitigation when purchasing mill relining equipment, as well as ensures compliance of mill operation with world standards.

Consequently, MGM Group significantly expands the range of technical solutions for concentrator plants:

• Modeling of the intra-mill solid ballistics Prediction of liner operating life cycle, mill throughput capacity.

• Supply of rubber lining for any mills with drum diameter in the range of 0.9 - 12 m.

• Supply of chromium-molibdenum steel liner for first milling stage mills;

• Participation in the engineering design of concentrator plants to include advanced relining systems in the project;

• Supply of advanced relining systems: Recoilless bolt removal hammers, liner handlers, specialized tools and equipments by Russell Mineral Equipment;

• Rendering of mill relining services according to high world class safety and works deadline standards;

• As well as supply of a wide range of durable rubber and polyurethane products, including rubber magnetic and ceramic alternatives.

Primary technical solutions do not require significant CAPEX, and the delivered result warrants the integration expenses at the earliest.

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