

Breaking News in Breaking Rock

Breaking oversized rock is a must in underground mines and open pits alike. With modern technology there are no reasons why it can't be just as efficient as all other aspects of the mining process.



Pedestal Boom Systems in action, over a grizzly and over a crushing station (right), which demands a longer reach.

Boulders produced by rock blasting are currently an unwelcome by-product of the mining process. In underground production areas, they are too big to muck out, too big for crusher stations to handle, and too big to go through the bars of the grizzlies above an ore pass. Even if a boulder can be dropped into an ore pass, its size and weight can destroy the pass and cause blockages and bottlenecks in the production flow.

While it is true that boulders are created by insufficient blasting or blasting difficulties due to hole deviation, they are a reality and must be broken up into smaller, more manageable pieces for haulage or crushing. This is an arduous and monotonous operation that can be difficult and costly. Boulders also occur in the rock masses created in caving methods, and these also disturb the rock-flow process and must be taken care of.

Basically, there are only two ways of dealing with these unwanted boulders. They can either be drilled and blasted or broken up using a variety of hydraulic breakers. Both methods have their advantages and disadvantages, but hydraulic breakers are preferable to drilling and blasting, particularly underground, due to safety and environmental considerations. In the long term, heavy-duty pedestal boom systems (PBS) are considered the most economical alternative. They are powerful, high-capacity machines that can be relied on to break up the oversized boulders continuously.

A worthwhile Investment

There are several types of pedestal boom systems available, and although capital-intensive, studies show that they will be more economical over time, providing they are regularly and properly

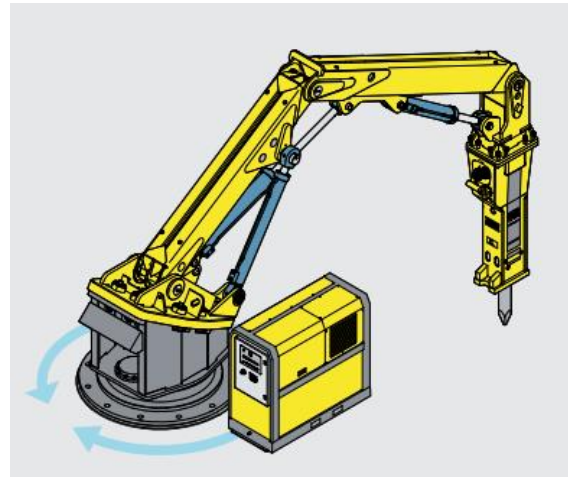
serviced. For the most part, two-section boom systems are used for secondary breaking at grizzlies underground, while three-section boom systems are used at gyratory crusher stations at open pits.

The mines of South Africa are typical examples. At the South Deep Gold Mine, a two-section boom system is in operation 3 000 m underground, breaking up 1 000 tonnes of rock per day. After it was installed, production increased by as much as 50% per month, largely due to the low maintenance costs. The solid structure of this system weighs approximately 10 tonnes. It has a 6 m reach for complete coverage of the breaking area and can be rotated 280° for easy maintenance access.

Similarly, a three-section boom system is in operation at the Anglo Platinum Mine in Makopane. This setup weighs 23 tonnes and has a maximum reach of 12.5 m, allowing for a longer, deeper, and complete coverage of the crusher box but requiring only a small parking radius.

Among the pedestal boom systems currently available, the XD series PBS from Atlas Copco stands out. Specifically built for this application, these breakers are designed for heavy-duty grizzlies and gyratory crushers that demand high strength, durability, and manoeuvrability. All XD parts are extremely robust to withstand the rigors of the harsh rock-breaking environment and a relentless 24/7 operational cycle.

There are nine systems in the series offering a breaker weight of 200–5 800 kg and a wide reach of 2.7–11.4 m for complete coverage of the breaking area. The boom is mounted on a massive, heavy-duty base that positions the breaker to reach and shatter oversized and lodged rocks in any part of the grizzly or crusher mouth. Reinforcement plates ensure an even stress distribution, while key components such as the pedestal boom's flexi-base, slew mechanism, cylinders, large-diameter pins, and pin-locking system work in harmony to get the job done. With easy access to all service points, these systems are also simple and quick to service for maximize uptime.



Rotational slew mechanism up to 280° for easy reach and maintenance.



Breaking oversized rock is an essential task at crusher stations.

A PBS system is typically installed close to ore passes or rock chutes into ore passes that have grizzlies over the openings. A suitable mounting area is usually prepared at the side, a platform is built, and the PBS is installed on top of the platform. These installation setups are also designed to be maintenance friendly and located near crushers. In LHD automation areas where no one is allowed to be in the vicinity, a PBS system setup is often a must to ensure a constant, uninterrupted ore flow.

Future Development

Although most PBS systems today focus on breaking boulders up to a certain size in an effective way, it is conceivable that future designs will be able to break even larger size blocks with maintained efficiency, thereby reducing the need for secondary breaking with drill and blast. In addition, future PBS equipment will most likely be able to improve the steady flow of material to the crusher with even smaller size rock fragments, which will lower the crusher's energy consumption.

Advanced maintenance solutions and easy data transfer using the RCS system also make the pedestal booms reliable and ready for tele remote control and thereby well prepared for future technology challenges.