MillScanner™ with AID™ (Accurate Impact Detection) is a cutting edge software & Smart Sensor system that displays a radial trend of mill sound and vibration energy to identify charge toe, shoulder levels, and ball-to-liner impacts for unprecedented SAG mill control, insight, and reliability.
The throughput and efficiency of a SAG mill depends on the volumetric load: An overloaded mill has reduced coarse ore breakage, as the cascading balls and rock cannot drop far enough, reducing kinetic energy for breakage. An underloaded mill will break coarse ore well, but at the expense of added grinding ball consumption and increased risk of liner damage. Also, if underloaded, significant throughput will be lost in the fine and mid-size fractions as the surface area for attrition is reduced.

Typically, SAG mill control is performed with respect to bearing pressure and other process variables which are used to estimate volumetric loading in order to optimize the mill throughput. While these methods are typically effective, they can also have several shortcomings when changes in mill liners, lifter profiles (wear), ore density, rotational direction, and/or temperature occur. Using a highly innovative solution that is fixed in rotation with the shell of a SAG mill, MillScanner™ now provides the control room with a direct measurement of the charge toe location which can be used to optimize the mill. The accuracy of the charge toe / volumetric loading measurement will be independent of temperature, ore density, liner/lifter wear, or mill direction, and the result is an extremely consistent and robust process variable for use in control strategies that will both optimize throughput and increase mill reliability. In addition to providing the location of the charge toe, MillScanner™ also acts as an expert ear for the mill and has the ability to accurately detect ball-to-liner impact occurrences.

By quantifying the charge toe angle, or the media angle (β_{dynamic}), on each rotation, a precise control strategy based on the internal dynamics and volumetric loading of a SAG mill is now possible. Also, by studying the complete evolution of the charge toe or media angle through the liner lifetime, improved strategies, liner designs, and control system performance is possible.

![Diagram](image)

**Figure 1. Definitions of angles and general installation dimensions**

The included MillScanner™ PC software displays the radial vibrational trends to the control room for general supervision, and it will make the data available to any data historian, DCS/PLC, or Expert System via industry standard OPC communication. The unit installs quickly and effortlessly using magnetic fasteners, and MillScanner's™ wireless signal will travel up to 100 ft with a clear line of site to the receiver antenna. Extended life batteries come standard, and their long life allows them to be replaced alongside of other scheduled routine maintenance.
MillScanner™ will provide valuable data to assist the mill operators in creating innovative strategies and improved liner designs to optimize throughput and increase reliability.

Advantages:

- Create optimal control strategies around charge toe and media angles as process variables
- Monitor liner wear and other efficiency changes in order to optimize liner/lifter replacement and design
- Improve grate discharge design to keep pulp level constant all through the mill length
- Optimize and control the mill media filling degree to reduce production costs while keeping the same grinding performance.

Figure 2. Example of MillScanner™ being used in a GrindingExpert™ solution
KnowledgeScape is very aggressive in our pricing, and we guarantee to not only beat any competitor on price, but in value. Our customer service and technical support is second-to-none, and we guarantee the best possible solutions for your minerals processing plant.

Because the scope of a typical project can vary greatly, we also offer a wide range of solutions at varying price points. The great thing about working with KnowledgeScape is that our years of experience will result in the quickest implementation possible and the provide best possible results. This means less downtime to our customers, and larger increases in your profits. Feel free to contact us at anytime and we can provide a timely and highly competitive quote for your minerals processing project.

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