

SBS ACOUSTIC SYSTEM CUTS GRINDING MACHINE CYCLE TIME BY 14%



Changes in micro-stresses within CNC machine tool structure, caused by contact between tooling and work-piece, generate high frequency signals known as acoustic emission, or AE. AE signals can be detected using the SBS AEMS Acoustic Emission Monitoring System, and used for advanced machine process control.

In the case of grinding machines, this high frequency structure borne noise is created when the grinding wheel touches the part, or the diamond dresser. AE signals travel through solid materials, for example, tooling, with high velocity, meaning they are an ideal parameter for the detection of grinding wheel contact within milliseconds of time, or microns of axis travel.

Double Disk Grinding, a form of Face Grinding, is no exception. The recent

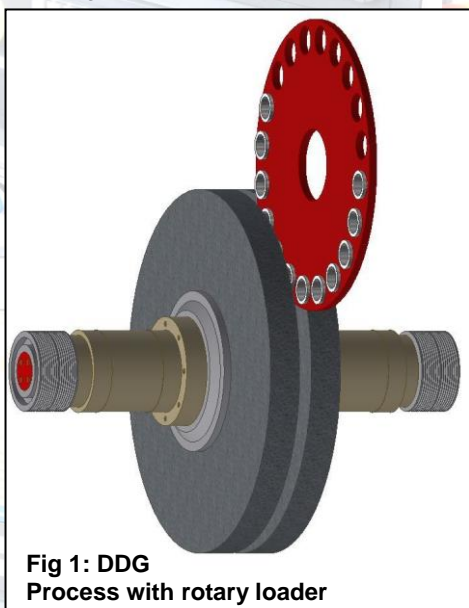


Fig 1: DDG Process with rotary loader

application of the SBS AE system to a DDG grinding process for rolling element IR (Inner Race) bearing faces resulted in 0.5 second saving on a 3.6 second grind cycle - a 14% reduction. In this case the saving was made by using the system to detect contact between grinding wheels and work. A process also known as Gap-Elimination or GE. The ability to detect part contact in less than 1 millisecond, allows

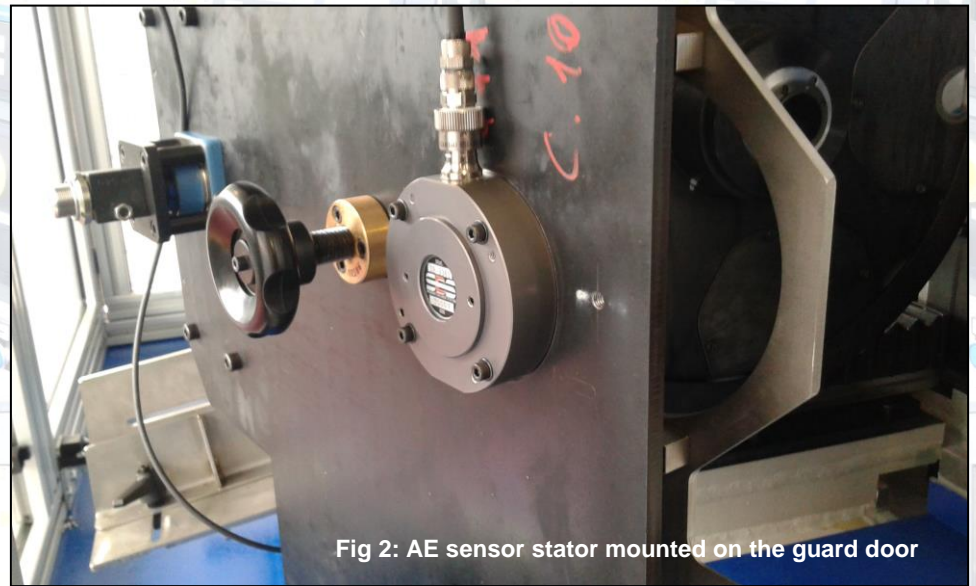


Fig 2: AE sensor stator mounted on the guard door

higher machine feed-rates, and less air grinding time, typically saving anywhere from 10% to 20% cycle time.

Correct AE sensor location and mounting on the machine is critical. To achieve maximum sensitivity, best AE signal path and biggest cycle time reduction, a non-contact acoustic sensor was mounted on the rotary loader spindle. The corresponding stator was mounted on the guard door of the loader.

SBS acoustic emission sensors can also be used for dressing monitoring on double disk grinding machines - either point or rotary diamond units - giving dresser touch detection, accurate machine indexing and monitoring of dressing profile.

For maximum efficiency gains the system can be interfaced with the machine CNC or PLC via hardwire, profibus or ethernet protocols.

The SBS AEMS system is a permanent installation on a machine tool, and is available to machine manufacturers or as a retrofit package to end users.

SBS can combine Acoustic Emission signals with other measurable machine parameters such as spindle power and work-piece RPM using a system called ExactControl™.

These and other products will be displayed by SBS at this year's AMB exhibition in Stuttgart, Hall 008 Stand C05, and IMTS exhibition in Chicago Booth N-7533.



Fig 3: AE sensor rotor on loader spindle