

A NOVASPECT, INC. SOLUTION

CONTINUOUS VIBRATION MONITORING SUPPORTS QUALITY ASSURANCE IN STEEL FINISHING AT LOCAL STEEL MILL

Summary

The surface of a coil of steel must be flawless before shipment to manufacturers of highly polished parts such as auto hoods or appliance doors. Yet, heavy-duty roll grinders and other Finishing Mill equipment are subject to extreme loads that can damage bearings and other machine parts, causing vibration-induced “chatter”. The end result can be a noticeable pattern on the surface of the steel, which may require rework and could even lead to the costly rejection of that product. To combat vibration at all levels, steel companies employ specialized technicians who go into the mill with handheld equipment to measure vibration levels on rotating equipment and analyze the results. To obtain zero-defect quality, it is absolutely critical to identify roll grinder vibration as early as possible.

Now, a steel mill in the Novaspect territory has carried vibration monitoring one important step further by installing the CSI 4500 Machinery Health™ Monitor on its sheet cold rolling mill and work roll grinders to continuously guard against mechanical problems that could result in surface defects.

Results

After six months of operation in the mill, the CSI 4500 Monitor is making a positive impact. It not only provides continuous information regarding possible machine problems early enough so that vibration issues can be avoided, it generates useful data providing new insights into the operation of the sheet cold rolling mill and the roll grinders. Mill personnel are learning what is really happening with these machines as a result of the way they are being run, and this information can be used to improve operating guidelines.

In addition, a number of area supervisors are now looking into opportunities to employ continuous monitoring in their areas of the mill to help generate awareness of mechanical problems leading to costly unexpected downtime of critical machines.



The Whole Story

Periodic route-based vibration testing with handheld devices is satisfactory for many types of rotating equipment, but the procedure is time consuming and provides only a “snapshot” of conditions at the time the measurements were taken. Technology now exists to continuously collect field-based information about the health and well being of a whole range of rotating equipment. Critically important turbines, generators, fans, compressors, pumps, and roll grinding equipment can be automatically monitored online for changes in vibration and rising temperatures – sure signs of impending trouble. Properly interpreted, these signals will pinpoint the location, nature, and even the severity of potential problems, enabling plant personnel to predict when a machine will need maintenance to prevent damage and avert lost production.

In a steel sheet cold rolling mill, “chatter” on roll grinders can lead to immediate poor quality of product once the roll is installed in the mill. Furthermore, chatter leads to excessive grinding time, rework, or even rejection. Chatter occurs as a response to an unstable operating condition between the structure of the grinder and its rotating components. There are many possible causes, including the way the grinder is being operated. Fortunately, the condition can be detected by monitoring specific frequency ranges, and the root cause can be determined through advanced analytical techniques. Upon detecting chatter, the machine operator must act quickly and decisively to eliminate the condition. This typically means adjusting the speed of the grinding process, feed rates, and pressures.

The CSI 4500 Monitor collects live vibration information from a number of permanently mounted sensors in order to quickly recognize changes in the operating state of a roll grinder. Using the power of dual processors within each CSI 4500, vibration levels can be accurately measured in less than 3 seconds and advanced analytical methods applied. Powerful diagnostic tools using orbit analysis and CSI's patented PeakVue™ technology allow for the early detection of bearing faults, supporting the continuous assessment of the machine's condition.

Operators view live data and make realtime corrections. At the same time, a complete record is maintained during each grinding operation for future reference, if needed. This gives supervisors a realtime and historical view of the effects of the operators' actions, enabling them to revise control schemes to minimize poor quality in the roll grinder area.

Management at this mill has come to admire CSI's machinery health technology because it is helping to support one of the industry's most rigid quality assurance programs while reducing costs due to rework and material rejects.