

## ITT ProSmart System Monitors Giant Metal Shredder for Recycler

A regional leader in metal recycling and processing located in Holland, Michigan processes metal scrap using a monstrous shredder. The shredder is known in the industry as a hammermill, whose primary purpose is to shred large items like cars and structural steel scrap into small pieces. The hammermill shredder is a powerful (4000 HP) machine that undergoes major stress and abuse during operations. It has 34 rotating hammers, each weighing 250 pounds, which rotate at 720 RPM to quickly shred whatever is fed into the machine.



### A Need for Continuous Predictive Maintenance

Tom Spettel, the president of Predictive Maintenance Services, Incorporated (P-M-S-I) provides engineering and maintenance reliability services for a wide range of industrial rotating machinery, including the large shredders at the Holland, Michigan recycling facility. Spettel notes that, "because the shredder is a brute force machine, there are always mechanical issues that impact its uptime at the recycling facility." For safety reasons, no one is allowed to be on or near the shredder while it is operating, mechanical problems often went unnoticed until there was significant collateral damage or a breakdown. Typically, it takes 8 to 10 hours to change out a bearing. If the bearing spins on the shaft, then the repair time could be two days or more. Because of the critical nature of this machine, Spettel suggested that the customer install an ITT Goulds Pumps brand ProSmart<sup>®</sup> condition monitoring system to help monitor the machine on a continuous basis.

## ProSmart Provides Continuous, Cost-Effective Monitoring

The ProSmart installation on the shredder was intended to measure the various causes of vibration, which include rotor imbalance and bearing failure. This type of machine does not well lend itself to monitoring the unfiltered vibration amplitude with a simple vibration transmitter that provides a 4-20 mA signal. The bearing defect does not generate enough vibration energy to cause a change in the overall vibration signal, which may be as high as 1.0 in/sec during normal operation. Using the ProSmart system's capability to set independent alarm levels in up to 10 user defined frequency bands, the machine can be monitored to alarm on a bearing amplitude of 0.10 in/sec and an imbalance at 1.0 in/sec.

ProSmart also takes advantage of wireless technology to remotely send machine health data over the internet. When machine vibration, temperature, or any other process parameter exceeds established limits, ProSmart provides notification within seconds by email or phone. Installing the field device is simple and, without communication wires, fast and cost effective. Spettel notes that, "when there are potential problems, ProSmart sends emails to my cell phone."

## Imbalance Leads to Alarm

ProSmart recently alerted Spettel about a potential problem while he was teaching a vibration seminar in Detroit, which is about a four hour drive from the customer. "With ProSmart, I was able to view the data and do the analysis remotely during a coffee break."

The problem was an imbalance. Inspection revealed that two 35 pound caps, which protect the bolts holding the hammer shafts in place, had broken free and were shredded along with the rest of the scrap. This put the shredder badly out of balance. As the vibration increased, ProSmart alarmed Spettel to request shutdown of the machine. Upon inspection, they found the two caps missing.

