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## WHAT WORKS

### LUBRICATION DEDICATION

#### International Paper plant brings oil analysis in-house with calculated savings

**The International Paper** ([www.internationalpaper.com](http://www.internationalpaper.com)) plant in Courtland, Alabama, has had an on-site oil analysis program since 2003. "We have seven people doing predictive maintenance, all are vibration analysts, but I'm the only one who does the oil," explains Jeff Tucker, predictive maintenance, lubrication analyst at the plant. "We have four paper machines, three electric generating turbines, and three recovery boilers. It's a pretty good-sized place."

Before 2003, the plant sent about 80 oil samples each quarter to the Mobil Lab in Kansas City for analysis. The oilers collected the samples with very little training on how to properly handle them, lab result sheets were returned to the mill, and the engineer responsible for the sample program would look them over, distribute them to the proper areas, and write work orders as needed. Lubrication work orders seemed to get a low priority.

"Management had the foresight to realize in-house analysis was a PdM tool we could use," says Tucker, who now runs samples internally with the Emerson Process Management CSI 5200 Trivector Analyzer. "We already used CSI vibration equipment and had the software."

In 2003, CSI brought the instrument and set it up, remembers Tucker. "When he left, I could run a sample and analyze it," he says. "The CSI four-day class at the training center in Knoxville taught me how to set alarms and variables."

The minimum analysis frequency is monthly, he explains. "We started out doing 48 samples/month on the most critical equipment," he says. "I'm analyzing about 120 to 125 samples/month now, and I have an additional 60 to 65 samples quarterly. I've grown this program to where we're going to have to re-do our frequencies or add an analyst."

The earliest documented results the plant received were cleaning up oil. "But as we got educated, we learned that dirty oil was causing most of our failures," says Tucker. "We set targets and started cleaning up. Occasionally I'll detect enough wear metal and eliminate the problem before it starts. If it goes too far, a vibration analyst picks it up."

The plant developed a savings calculator. "We use a cost-avoidance calculator that considers downtime, manpower, and other things," explains Tucker. "We plug our numbers into it to determine cost avoidance. This group is documenting savings of \$4 to 6 million annually. More than \$900,000 of that was from the oil in 2010."

Tucker cites examples of failures that in-house oil analysis avoided. In January 2009, the plant added gear reducers on three sheeters to the



Jeff Tucker handles in-house oil analysis, in addition to his other maintenance duties at International Paper's plant in Courtland, Alabama.

monthly sample list. On April 1, 2010, a trace of wear debris appeared, the first ferrous index on this reducer. Quick to act, the team collected vibration data within a week that indicated a bearing problem. By April 12, the gear box was torn down and a bad bearing located and replaced.

In another example, presses in the pulp/bleaching area are driven by hydraulic motors, which are sampled each month and use synthetic hydraulic oil. "We use an ISO VG 68 synthetic hydraulic oil," explains Tucker. "The drums these motors drive have a bearing on each end that carries a very high load. These bearings are lubricated with Royal Purple Thermyl-Glyde 1500 oil. This oil is a small amount and doesn't circulate. They were not on any sample frequency at all."

The lubrication mechanic in that area drains the filtrate and water off of these bearings weekly or as needed because they aren't sealed adequately from the inside. In January, he noticed that the oil appearance was different and caught a sample for analysis. "I built the point in RBM Oilview and analyzed the sample," explains Tucker. "The high alarm on ferrous metal index in the bearing variable is set at 10, and the sample had an index of more than 8,000. We monitored it to an outage, and the bearings were replaced, but this caused seven presses to be added to the sample list. As a result, there were three other bearings found defective and they were repaired without failure." ©