

A discussion of common problems in paper machine vacuum systems helps mills correct the actual problem, not just its symptom

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Troubleshooting Guide Helps Mills Identify Vacuum System Problems

ALL WET-LAID PROCESS PAPER MACHINES have vacuum systems, and these generally operate without frequent problems. However, when difficulties occur within the vacuum system, it is often difficult to identify the actual problem and its cause. Many times, the symptoms get treated, rather than the problem itself. The troubleshooting guide in this article should assist mill maintenance and production personnel in quickly determining the causes of vacuum system problems and identifying the differences between vacuum pump problems and those external to the pump. The article will cover the most commonly occurring vacuum system problems.

When troubleshooting vacuum systems, as with any other operating problem, good techniques must be applied and questions must be asked. These questions include, "What changed and when?" and "Is this a problem or a symptom?". The vacuum system problems discussed in this article include:

- Low vacuum levels
- High horsepower—motor trip outs
- Hot pump operation
- Pump vibration

LOW VACUUM LEVELS. Low vacuum levels are one of the more common problems/symptoms experienced on a paper machine. The word "symptom" is really emphasized here, because the difficulty is rarely caused by the vacuum pump alone. However, the vacuum pump often gets changed out, only to discover the problem still exists.

First, recognize that vacuum levels are a measurement of resistance to airflow, where the airflow is induced by the vacuum pumps and the resistance is the various dewatering processes and system piping. Changes in resistance to airflow are caused by various process variables, including sheet moisture, basis weight, refining, felt porosity, suction roll condition, machine geometry, and machine speed. The following sections describe the effects of sheet moisture and suction roll condition on vacuum levels.

In addition, the following sections discuss some

typical causes of low vacuum levels, including: open valve in the vacuum line or header, plugged screens at the vacuum pump inlet, uncovered barometric seal leg from a pre-separator, or low seal water flow at the vacuum pump.

Sheet moisture. Typically, a drier sheet will allow more atmospheric air to flow through it. This is why flatbox systems are designed for higher air flows on the last suction boxes nearest the couch. As the sheet gets drier, it requires more vacuum capacity to maintain the same vacuum level. Additionally, if higher vacuum levels are desired, even more vacuum capacity is needed.

Cases have been observed in which a flatbox system is upgraded to increase sheet dryness entering the couch and, although the flatbox goal is obtained, the couch vacuum level drops. This lower couch vacuum is due to the lowered resistance to airflow from the drier sheet, which is caused by improved dewatering from the flatboxes.

Suction roll condition. Several problems can occur due to the condition of the couch or other suction rolls. First, the internal seal strips must be functional so that the rolls seal properly against the inter-



It is important to locate vacuum gauges at the suction box or roll as shown on these uhle boxes.

