PULP REFINER TRIAL TIPS

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THE KEY TO A SUCCESSFUL REFINER TRIAL IS IN THE SAMPLE COLLECTION PROCEDURE.

MANY MECHANICAL PULP MILLS HAVE GONE TO GREAT efforts to reduce refiner energy consumption while maintaining or improving fiber properties. The mills monitor their fiber properties during trials by measuring freeness, fiber length, fiber coarseness, fines characteristics, fiber collapse, sheet density, tensile, tear, burst, opacity, brightness, and shive content.

There are two questions that need to be considered before running mechanical pulp refiner trials:

1. What factors induce refiner fluctuations in my mill?
2. How can I make sure that I am collecting a representative refiner sample?

The key to a successful refiner trial is often in the sample collection procedure. Try to collect samples just before, during, and after the refiner change. The data collected just before the test should be at normal operating conditions. The data collected just after the test requires returning the conditions as close to those prior to the test as possible. By comparing the before and after data, you can see if a large change occurred in the process during the testing. If before and after data differ greatly, then the test data are questionable.

To help improve the odds that a system change did not occur, try to limit the length of your trial. The more time it takes to run a test, the more likely something will change in the process that can affect fiber properties. For example, if wood density changes, the consistency in the refiners and other areas can change without the operator's knowledge. A consistency change can affect refining intensity and alter fiber characteristics. So it is important to run consistencies on all the samples.

Samples used to test fiber properties should be taken directly out of the refiner blow line to avoid time delays and mixing that occur in the latency chest. Try to collect 10 samples approximately 1 min apart. Use these 10 samples to make one composite sample. That compensates for small fluctuations that can occur in the refiner due, for example, to surges in steam pressure or chip feed. The samples are then disintegrated to ensure latency removal, and the fiber properties are determined on the composite samples.

Some helpful tips on running refiner trials where motor load is changed:

1. Run your first tests on one refiner line. On later tests consider doing multiple lines.
2. Determine the total range of motor loads for your secondary refiner. Note: Your total motor load range may change daily as the wood species change.
3. Once you know your minimum and maximum motor load on your secondary refiner, choose five motor load settings, including the minimum and maximum motor load.
4. Always start at your maximum motor load and work your way down.
5. If the motor load tests are run on the secondary refiner, try to hold the primary refiner as constant as possible. Collect samples out of the primary refiner as well to tell if fiber properties going to the secondary refiner changed during the test period.
6. Before collecting the first blow line sample, make sure to properly purge the line. Also purge the line quickly every time the motor load has changed.
7. Make sure the motor load has stabilized before taking your samples. It helps to have a colleague whom you can radio in the control room to verify this and who can constantly monitor and record the motor load during testing.
8. To separate the effects of specific energy changes from intensity changes, maintain a constant discharge consistency. This should be verified by consistency measurements on the collected pulp samples. *
9. When collecting the blow line samples, it is critical to seal the samples in plastic bags as soon as they are caught. Otherwise the steam in the sample will vaporize, and the consistency can be greatly affected.
10. When making a composite sample, use a large bag. Fill it half full with equal portions of pulp from each of the 10 samples. Close the bag so it is half full of air and shake it vigorously for one minute. **TJ**

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*For details on how to calculate specific energy, see R. Alami et al., *Tappi J* 80(1): 185(1997).