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12870-E

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Ultrasonic Characterization of Settling Suspensions

SUMMARY

PNNL researchers have developed a sensor that can characterize a fiber suspension, which may be of particular interest to those in the papermaking industry. When refining wood pulp for paper, the mechanical action of the rotation and grooved circular refiner plates produce a pulp-fiber slurry. The image (see adjacent) shows the settling of two types of pulp: unrefined and refined. In the beginning, both are basically the same, but over time the refined sample does not settle as much as the unrefined sample.

Our sensor monitors the settling process by putting a transducer on each side of the settling vessel. One transducer acts as a transmitter and other acts as a receiver. The signal in the receive transducer is affected by the pulp passing in front of it and essentially measures the pulp concentration. A peak in the signal occurs at a specific time, called the "peak time." The results show that the peak time is dependent upon degree of refining, or the amount of time in the refiner. Consequently, the ultrasonic sensor can determine the degree of refining, making the refining process more efficient.

While this method was developed for wood pulp, it is applicable to many other mixtures where determining the appropriate size or morphology of fairly large particles is desired.

ADVANTAGES

- * Increases efficiency of the refining process
- * Peak time shows degree of refining

RELATED LINKS

- » **Macro Property Measurement Website: Acoustic Evaluation of Liquids in Containers**

<http://www.techmet.pnl.gov/sensors/macro/projects/es4upecw.stm>



Patents & Intellectual Property

- » Patent #: 7,140,239

Technology Portfolio(s)

- » Ultrasonics
- » Physical Sensors

Potential Industry Applications

- » Agriculture & Mining
- » Chemicals
- » Consumer Products
- » Energy & Utilities
- » Food, Beverage & Tobacco
- » Healthcare, Pharma, Biotech & Medical
- » Oil & Gas
- » Recycling & Waste Management
- » Wood, Paper & Forestry

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