

# KNOCK ON WOOD

Using **sound waves** and **infra-red** light to **SEE** inside logs and trees

*Notable notes in forest research at Oregon State University College of Forestry*



any logs appear similar on the outside, but the inside can be a different story.

Some have wood that is stronger and denser, making it

more valuable for construction and other uses.

But if the logs look the same on the outside, how can we tell them apart? Professor Glen Murphy (Forest Engineering) at the Oregon State University College of Forestry has some surprising new methods involving sound and light. Murphy is at the forefront of new technology that harnesses the power of sound waves to measure the stiffness of wood. “The stiffer the log, the better it is for making many products,” he says.

To measure the stiffness, the end of a log is tapped with a hammer, which bounces a sound wave up and down the log. While this happens, a meter is used to measure the time it takes the wave to travel back and forth. The more quickly the wave travels, the stiffer the log, says Murphy. However, sound waves aren't the only way to find out what's inside a piece of wood.

Murphy is also developing a technique that will allow foresters to “see” the density of a log by using near-infrared light, or NIR. This will help them decide where the log should go next for processing. NIR works through a concept called spectroscopy. A spectrometer shines light onto a sample of wood chips, and measures the amount that goes through the sample and the amount that bounces back. From the results, Murphy can determine the density of the wood sample.

This technique is already being used in grain harvesting to determine how much protein is in wheat. One of the problems with using NIR in forestry, however, is that it only penetrates a few millimeters into a sample. So how can this technology help foresters “see” inside a large log?

Murphy discovered that NIR can be used on small wood chips and even on the sawdust that flies from a cutting saw as a large log is being processed. In the future, NIR may even be used in the forest as a log is cut. This technology will help foresters in the Pacific Northwest get the most value out of timber they harvest.

“Most people don't think of logging as a high-tech job, but really, there is a lot to learn,” says Murphy “New tools like NIR and time-of-flight acoustics can help Oregon foresters keep up in the global market, especially with the growing competition from other timber-producing regions and alternative products such as plastics and steel.”

