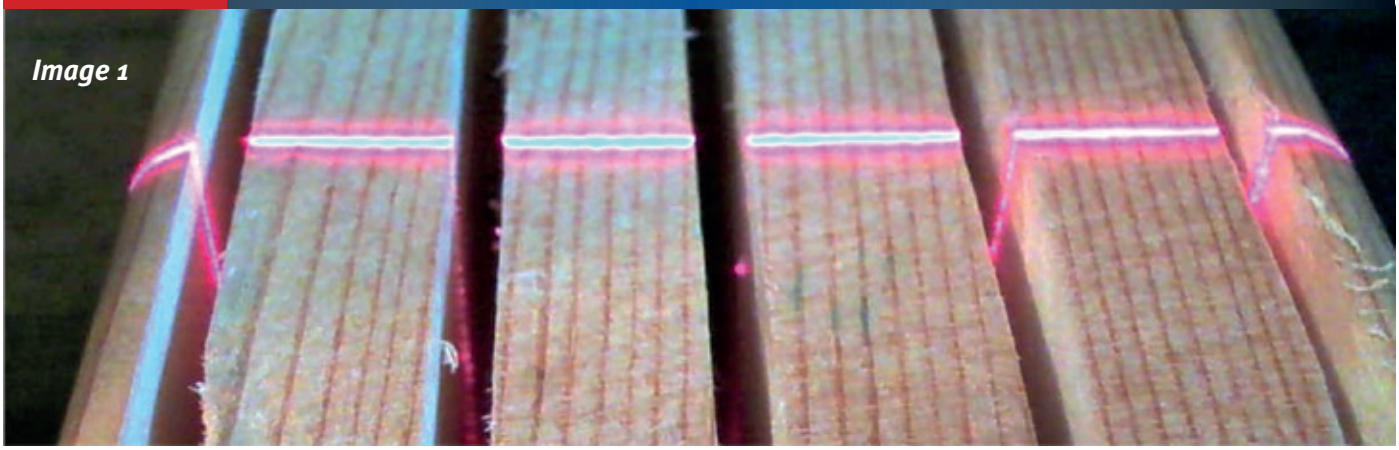


*Image 1*

# LMI shows way to 3D future

*Three-dimensional sensors have a key role to play in quality monitoring of lumber machinery*

Three-dimensional sensors have long been an essential technology in wood optimization for saw and planer mills, according to LMI Technologies' Terry Arden.

Originally introduced to maximize lumber volume recovery, next generation 3D sensors have given mill operators the ability to optimize for value recovery using integrated colour imaging and tracheid detection that evaluate wood for defects like knots.

Grade-based wood optimization alone, however, is not the only role 3D sensors play in today's mills. These devices are now being used for another critical mill function: quality monitoring of lumber machinery, otherwise known as error proofing.

"In error proofing, 3D sensors monitor the mill machinery itself, looking for early signs of wear and tear or non-conformance," Arden said.

"For example, the vibration or kerf variation of a saw blade, or width cutting accuracy of an edger or gang saw.

"Such an important monitoring function allows mill operators to continually assess mill machinery performance, determine maintenance and upgrade schedules, and track whether or not log and board processing is satisfying optimal dimension and quality specifications."

## Case in Point: Gang Lumber Size Control

To illustrate this all-important function of 3D sensors in the modern mill, it helps to look at a real-world example application: gang lumber size control.

As one of the first steps in lumber manufacturing, a log enters the sawmill and is processed through a primary breakdown machine, which typically produces side boards and a centre cant. The cant is then fed through a gang sawing machine to further break down the cant into boards (see image 1).

## Wear and tear on the gang sawing machine

The gang sawing machine is subject to heavy wear and tear. Its saw guide pads and saw teeth are also subject to wear over time, and can be damaged by foreign objects in the cant, such as nails and rocks.

Wear, tear and operational damage can drive the saw guides out of alignment and result in the saws 'snaking', or not tracking straight through the cant. In addition, feed and press rolls can wear down unevenly, and bearings can degrade inside the gang sawing machine, causing unwanted pressure to impact the saws and saw guides.

## The result?

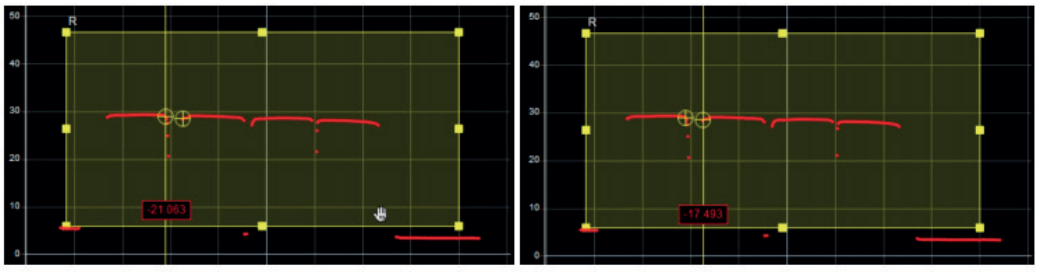
Any one of these conditions is a potential cause of poorly sawn lumber. Boards that are produced at the incorrect size have to be remanufactured, typically resulting in a loss in material value and extra cost in production time in the mill.

## 3D smart sensors and the gang lumber size monitoring system

"The ideal position for an automatic lumber size monitoring system is at the outfeed of each machine centre, allowing the system to quickly detect a problem and avoid prolonged production of defective boards," according to Arden.

This application is well suited

*Image 2*




*Groove X Tool measuring the edge of one board...* *...and the opposing edge of the neighboring board.*

for a laser-line based Gocator 3D smart sensor. With a compact and pre-calibrated 3D smart sensor capable of measuring at high speed to monitor board widths, the sensor can inspect each and every board for dimensional accuracy and communicate results directly to a PLC.

## How to implement the machine monitoring system

A Gocator 3D smart sensor is mounted above (or can be mounted above and below) the cant as it exits out of the gang saw, scanning the sawn surface/s of the cant after it has been gang sawn into boards.

The Gocator's built-in Groove-X measurement tool can measure each board width and monitor kerf size quickly and efficiently without any custom software programming.

These built-in tools are configured through a standard web browser. The sensor supports several industrial PLC protocols to deliver the X positions of the edges of all the boards across the block. Based on these measurements, the PLC will then monitor the board widths for unwanted variation (see Image 2).

## The benefits of monitoring lumber machinery

Lumber quality control began with manually measuring several points along the length of a board with a tape measure, then moved to using a mechanical caliper to QC test small samples of boards throughout the mill process, according to Arden.

"Fast forward to the present day, and non-contact sensor based measurements have radically changed the lumber processing game," he said.

"Next generation 3D smart sensors now offer mills a simple, automated solution with the ability to perform high speed built-in measurements for use in many machine centres in the sawmill and planer mill.

"This powerful 3D all-in-one smart sensor technology can be integrated directly into a machine centre to monitor and error proof critical processes, reliably tracking manufacturing performance, and identifying malfunctioning cutting tools and components at the point of occurrence. Perhaps its greatest strength, however, is the ability to eliminate the gap between the occurrence and detection of events that lead to incorrect manufacturing."

> **Next generation 3D smart sensors now offer mills a simple, automated solution with the ability to perform high speed built-in measurements for use in many machine centres in the sawmill and planer mill**
>
> *Terry Arden, LMI*

There are numerous benefits of using 3D smart sensors in monitoring machinery, including a) their ability to use measurements together with programmed limits to monitor sawing variation and produce alarms; b) pass the measurements off to a computer to provide detailed SPC analysis to identify sawing variation as 'snake', edge-to-edge 'wedging', or end-to-end taper to help identify root cause/s within the machine that could be resulting in off-size lumber; c) and finally, analyze opportunities to increase feed speed (throughput) or reduce saw kerf and/or target sizes while staying 'in control' with output lumber sizes.