

Integrated vision system helps speed production, maximize efficiency at Pleasant River Lumber

Application Update: Integrating a new vision system can calculate the measurements of each tree-length log in about 7 seconds, 9 logs per minute, nearly 10 times faster than previously.

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A family-owned Maine business with four generations of experience in the forest products industry, Pleasant River Lumber produces more than 100 million board feet of spruce dimensional lumber and eastern white pine annually from its three mills in Dover-Foxcroft, Hancock, and Enfield, Maine. Pleasant River Lumber prints an American flag and the grader's name on all the lumber it produces as a sign of quality.

The market for lumber is in a constant state of flux based on factors like the time of year and current customer demand, and mills like Pleasant River Lumber need to be highly efficient to stay competitive—and this efficiency needs to begin almost immediately after a tree is cut.

In Pleasant River Lumber's original approach to lumber processing, tree-length logs—up to 64-ft long, the most economical for a mill to purchase—were delivered to the mill yard where five manual “slashers,” large circular saws, cut them into 16-ft lengths, usually leaving a short piece as waste.

“Since the entire process was done manually on multiple logs at the same time, there was no optimization of the material or of the time and effort required to process it,” said Christopher Brochu, one of the six partners who operate Pleasant River Lumber. “A human being made a decision as to where to cut each log, and it was impossible to determine accurately how to cut the log to get the greatest value from the material,” Brochu said. In addition, operating the “slashers” themselves was expensive in fuel and labor, and the company lost money on the waste material, which often had to be trucked away.

Getting an optimum Look

When Pleasant River Lumber purchased its Dover-Foxcroft, Maine, mill in 2004, the partners committed to a \$12 million investment to modernize the facility, including the part that processed tree-length logs for milling. Recognizing the benefit of



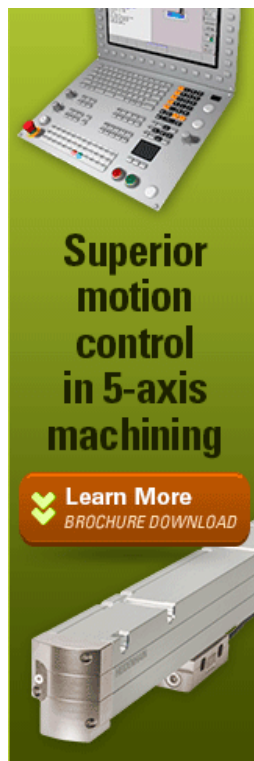
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leveraging technology for improved productivity and efficiency, the partners turned to Maine-based Progress Engineering, which specializes in designing and implementing process automation solutions, with forest products industry experience. Progress Engineering designed a hybrid system using solutions from a number of vendors, which would allow Pleasant River Lumber to increase efficiency by getting the greatest amount of fiber possible from each tree-length log.

As Dana Hodgkin, the president of Progress Engineering, explained, the new process begins in the mill yard where each individual log is evaluated using a vision system that captures images of the log. Six ceiling-mounted color cameras work in tandem to take images of each log. These images are “stitched together” by a vision appliance and vision system software, which “calculates the length and diameter of each log, with accuracy to within an inch,” Hodgkin said. “That data is then seamlessly communicated via Ethernet with a PLC optimization system developed by Progress Engineering.”

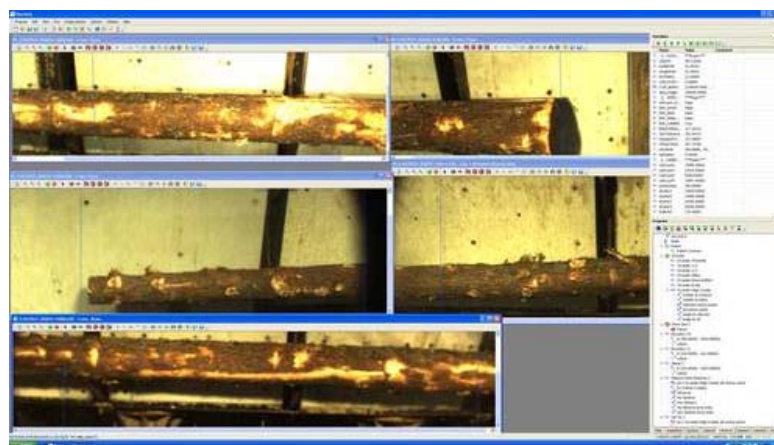
Progress Engineering’s original design used a camera from another manufacturer, and Hodgkin cited problems with this design from the start. “The first camera we considered...didn’t offer a way to capture a clear view of an entire log, which was critical to getting the accurate measurements that ensured the rest of the system operated as required. There were also challenges with the other camera’s ability to operate in a rugged mill environment,” he said. “When our first design failed, we researched alternatives.”

Since the competitive solution had challenges operating effectively in an environment where conditions, particularly lighting, changed frequently, ensuring the new vision system could work under these conditions was a key selection factor. One wall of the facility is open to the elements, which means that lighting, temperature, and even wind can vary from hour to hour. The vision system used offers automatic ambient light detection and can change the exposure time quickly to provide the right level of contrast between the log and the background for each image.

LED lighting was applied overhead for greater consistency. The vision system adapted perfectly to the changing conditions, Hodgkin said, who also praised the machine vision experts involved.





Once the PLC system receives the data about the length and diameter of each log, it integrates with a new “bucking system”—equipment including log singulators and saws—that forms the majority of the new production system. Manufactured by Endurance Equipment, this part of the system analyzes the data from the vision system, determines the optimum location for each cut, and then cuts each tree-length log in a process that is fully automated.

“Investing in this new system was critical for Pleasant River Lumber to become more efficient, and to be highly efficient, we need to get the most usable material possible from each log,” Christopher Brochu said. “Raw material accounts for 70% of our total cost, so the more lumber each log generates, the more competitive we can be.” The new vision system begins the production process with “precise measurements of each log.”



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