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Roseburg Gets More From Bucking

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High volume mill operations can reap big benefits from automating processing steps to smooth the flow of materials through the mill. This can be accomplished by augmenting human decision-making with the latest automated optimization support. A case in point is the recent upgrade of the bucking operations at Roseburg Forest Products' Dillard, Ore. complex by Concept Systems Inc. of Albany, Ore. The Dillard facility includes a plywood plant and a stud mill, processing approximately 200 million feet of logs per year. The facility's production rate increased by 5% by installing Concept's new LengthScanPro laser log measuring systems on three bucking lines, according to the participants.

Roseburg's big concern was getting blocks through the chop saw and minimizing trim waste. Throughput and efficiency were the key factors. Before the upgrade, the sawlines used cameras to help bucking operators make cutting decisions, but the quick, on-the-fly decision-making process was error-prone, often requiring changes in cutting strategy after the first cuts were made. Any operator hesitation resulted in slowing of production, and mistakes in cutting decisions resulted in wasted fiber. If an operator made an error in estimating log length, it could result in a 2 ft. block being cut off, typically on the large (and most valuable) end of the log, in order to adjust the log to standard length

Challenged with eliminating such inefficiencies and increasing productivity of the mill operations, Roseburg's mill managers called in Concept Systems for a solution that would give them better bucking information. Based on years of experience with retrofitting mill control systems, Concept provided four different alternative solutions for review by mill personnel.

The solution that was chosen by Roseburg Forest Products is based on LengthScanPro, Concept's new log measuring system that incorporates Laser Radar technology to measure linear displacement, taking advantage of the recent speed and accuracy advances in this technology. This, coupled with standard diameter scanning technology, allows LengthScanPro to generate accurate log models with a level of simplicity. Another advantage of LengthScanPro's design is that it can be retrofitted to existing lines.

LengthScanPro is designed for operations that require very accurate stem length information, where the true shape of the stem is not as critical to the bucking solution. Roseburg, like many other mills, has determined that the single most important piece of information it needs to predict the best bucking solution is stem length. Diameter and sweep are important, but to a lesser degree. In support of this bucking strategy, the system used by Roseburg provides diameter information to a +/- 3/8 in. accuracy along a single axis (two-axis

diameter measuring capability is an option).

An alternative way of measuring log lengths during the bucking process would have been through the use of multiple photo eyes spaced 4, 6, or 8 ft. apart. An encoder on the log transport chain would be used to keep track of log position; however, this measurement technique is prone to inaccuracies due to log slippage.

The biggest technical hurdle that Concept overcame in the process of designing LengthScanPro was masking out the fixed obstructions that, just like logs, also are visible to the laser scanner. (The scanner that Concept Systems uses is capable of reading distance measurements in a 100-degree wide swath at a 100 ft. distance). LengthScanPro has to determine how to tell what was a log and what is a piece of structural steel in real-time as the log is moving.

The raw data coming from the laser scanner is provided in polar coordinates, and must be converted to Cartesian x and y coordinates before filtering out irrelevant information. Then, to sort out whether a response is a log or not, the system defines the set of specific x-y coordinates that describe a valid "window." Converting the coordinates and identifying the responses in the coordinate range as moving logs was also a challenge from a computational perspective.

The laser scanner tracks the back end of the log, while a light curtain is used to provide log diameter information and to signal when the front of the log has been engaged by the system (which provides the trigger for laser scanning of the distance to the back of the log). The data from the diameter scanner comes into the PC over Ethernet and the data from the Laser radar comes over a high-speed serial line. The system needs to read the laser only once every 50 milliseconds in order to deliver length measurements that are accurate to +/- 1 in., regardless of log slippage.

Though LengthScanPro needs to incorporate only one laser to measure logs of uniform size, the actual Roseburg installation used two lasers, set at 3 and 7 in. off the deck, to allow the system to work with different diameter logs and logs with excessive sweep and crook.

LengthScanPro includes a Solution Generator software package that uses the log model data to generate bucking decisions that minimize trim loss according to a priority-based bucking formula. It was developed with flexibility and ease of use in mind, giving mill personnel the ability to modify solution criteria and see simulated results offline.

Roseburg tried out the LengthScanPro on the largest volume line first - the 35 in. debarker/saw line that produces blocks for the stud and plywood lines. When this line was up and running satisfactorily, two more lines were automated, bringing the total production being scanned across the three lines to approximately 18,000 blocks per 10 hour shift. With the new scanners in place, Roseburg's managers are seeing a 5% increase in production volume, which promises to enable the project to pay for itself in under six months.

This article was submitted by Concept Systems, www.conceptsystemsinc.com.

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