PROCESS IMPROVEMENT

Light Transmission Method of Green Veneer Moisture Sorting

by Brian Martin and Mike Crondahl

Accurate green veneer sorting has a significant impact on both veneer dryer productivity and final veneer quality. Although some species such as Southern Yellow Pine are not moisture content (M/C) sorted today, almost all other species are, and the moisture content of green veneer from these species is currently measured with industrial radio frequency (RF) sensors installed beneath the veneer ribbon. Based on these RF moisture readings, generally submitted as an average moisture content-only reading, the veneer is then typically sorted into three general groups—sap, light-sap and heartwood.

Laboratory testing has shown that when using contact-based RF sensor head technology, a gap as narrow as 1 mm between the veneer and the sensor head will cause inaccurate moisture readings. These can be as much as 50 percent, with the level of error and inaccuracy increasing dramatically as the sheet gap increases.

With the high speeds of today's green-end conveyors it is virtually impossible to maintain direct contact between the wavy veneer and the RF heads. This means that very inaccurate sorts occur, especially within the high moisture content veneers where RF sensor heads have been proven to be most inaccurate at moisture measuring.

The other issue with RF heads is their inability to read moisture contents above the fibre saturation point (FSP) of approximately 30 percent. This limitation makes them ineffective for measuring the M/C within the wetter species of woods, such as Southern Yellow Pine. Our own on-site mill observations indicate that there could be positive advantages to sorting these wetter woods into at least two basic sorts. These narrower moisture sorts, combined with the implementation of new dryer recipes to match the accurate sort points, could afford significant operational savings within the dryers, as well as producing a higher quality veneer.

A survey of mills showed that each 1 percent loss in dryer production from inaccurate RF sensor heads costs the average mill, conservatively, an extra $150,000 to $180,000 per year. (This figure factored in production losses and excess energy consumption due to high re-dry and over-dry rates; 80 percent of a mill's yearly energy costs are consumed by veneer drying.) And with today's escalating energy costs, this number is expected to rise in the future.

An alternative technology now exists that effectively solves each of these problems. By utilizing the latest advancements in both LED line-light transmission and CCD camera technology, this new patented moisture detection technology provides the industry a highly accurate, non-contact, high-speed method of green veneer moisture measuring for the first time.

By tightly controlling the pulsed light output within a high-intensity LED line-light array, the green veneer can be effectively 'candled', allowing an actual visual image of the moisture locked within the veneer sheet. Gathering this visual image 'map' by utilizing a specially aligned and highly sensitive CCD camera, and then passing that information through a complex series of algorithms, an exact moisture map of each sheet of veneer can be determined to instantly provide both the average and peak moisture content sort criteria for each sheet.

With this information determined, each veneer sheet is assigned specific numerical moisture values. These peak and average moisture values effectively become the moisture 'finger print' of that particular sheet, which in turn allows the veneer to be very accurately sorted either to a set of criteria specifically formulated for each species and thickness or to any number of customized mill-specific criteria as required. With this highly accurate information, veneer sheets can then be sorted into any number of bins and without limiting the number of sorts possible.

Dryer tests of this new technology conducted recently at a British Columbia mill by Forintek Canada Corp. showed an overall improvement of 10.1 percent, based on a 7.6 percent improvement in dryer productivity, a 2.5 percent gain in target dry veneer (i.e., correct moisture content). The report also cited a 0.15 percent reduction in re-feed veneer and a 2.7 percent reduction in re-dry veneer. The tests compared a three-bin light transmission sort with a three-bin RF head sort. The improvement is expected to increase when the mill moves to a four-bin light transmission sort.

High moisture content species, such as Southern Yellow Pine, traditionally have never been separated into different moisture contents, as RF type sensor heads are unable to accurately sort at the higher moisture range above fibre saturation. This new patented technology is expected to revolutionize green veneer moisture sorting and perhaps even provide a substantial production increase by providing Southern manufacturers a method to successfully sort 'wet' species for the first time. ■

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