OPPORTUNITIES PRESENTED THROUGH MOISTURE SORTING OF GREEN LUMBER USING THE NOVAX 8010 INFRARED MOISTURE SENSOR

David Atnikov
Novax Industries Corporation
New Westminster, BC

The goal of any new technology is to conserve the resource while still maintaining or improving profitability. Timber cutting restrictions, increasing rigid environmental standards, and offshore quality requirements will all play a greater role in the lumber industry's future profitability,

Each of the current techniques for sorting green wood materials by moisture content suffers from one or more of the following inherent drawbacks:

1) sensitivity to variations in wood density
2) mechanical drift
3) requires precision volume measurements
4) inappropriate above the fiber saturation point
5) not non-contact
6) species-dependent readings

Research by scientists at the Forintek Canada Corporation resulted in a practical and effective method for sorting green lumber using infrared sensing. Commercial development and implementation of this method by Novax Industries Corporation has made it available to mills.

BACKGROUND

Novax Industries Corporation has been involved in the design and manufacture of control systems since 1965. Novax Industrial Control provides the control electronics for much of the equipment manufactured by Durand Raute, formerly Durand Machine. The electronic design, development, and manufacturing experience Novax has developed over the last 20 years proved to be a valuable asset when Forintek was considering a potential commercial development partner for the infrared process. In early 1987, based on the results achieved during the initial Weldwood trials described below, an agreement was reached whereby Novax Industries Corporation purchased the right to manufacture and sell devices based on the Forintek process under protection of the Forintek patent.

TRIALS

In 1986 Forintek conducted a significant mill trial at Weldwood of Williams Lake, BC utilizing the new infrared moisture sorting technology to assess the economic benefits of sorting green SPF lumber. The objectives were:

1) determine improvements in grade and recovery, and
2) establish reductions in drying time while meeting moisture standards

The results of this trial are shown in Figure 1. The Weldwood experience revealed savings of $8.50 per 1000 board feet in grade and recovery, an increased recovery of wet/dry sort over control of 3.45 percent, and a 22 percent reduction in drying time. With similar results, a mill operation with large production could save in excess of a million dollars annually.

GROUP A - CONTROL

-Not Measured by Sensor
-Sample Above and Below 35% Moisture Content
-Schedule 210° F Dry Bulb
170° F Wet Bulb
32 Hours
Kiln Charge - 176 MFBM

GROUP B - WET SORT

-Measured by Sensor
-Sample above 35% Moisture Content
-Schedule 210° F Dry Bulb
170° F Wet Bulb
32 Hours
Kiln Charge - 166 MFBM

GROUP C - DRY SORT

-Sample Below 35% Moisture Content
-Schedule 210° F Dry Bulb
170° F Wet Bulb
20 Hours
Kiln Charge - 182 MFBM

Figure 1. Kiln charges established for infrared moisture sorting trial at Weldwood.

In mid-summer of 1987 Novax industries entered into a cooperative relationship with Riverside Forest Products of Lumby, BC. Riverside Forest Products operates a stud mill with annual production of 70 to 80 million board feet. Riverside sought to achieve a reduction or elimination of drying time for dry sorts, a reduction in degrade by not overdrying, an improvement in volume recovery via a reduction in splits and twists, and an increase in throughput at the planer.

A number of factors make moisture optimization necessary. Natural growth and climate conditions, beetle kill, heartwood, and processing time all contribute to moisture variation in the green product. Based on these, it was determined that with three sorts material less than 22 percent moisture content could bypass the kilns, the lumber between 22 and 35 percent could have a reduced drying time, and the lumber greater than 35 percent could have the current or a slightly extended drying time.

At Riverside Forest Products approximately 3 to 8 percent of the material was dry enough to by-pass the kilns. Note, however, that for export (Australia) environmental regulations require approximately 6 hours at 165°F. In the middle moisture content range drying time was reduced approximately 30 percent, grade recovery increased by 2 to 3 percent, and volume recovery increased approximately 1 to 2 percent. Reduction of kiln time and planer downtime has increased throughput 2 to 3 percent. Specific runs have improved as much as 8 to 10 percent.

As a result of the cooperation between Riverside and Novax, the design and development of the infrared sorter were streamlined. Many of the features incorporated into the sorter are a direct result of feedback from mill management.

The moisture sensor is designed to improve the bottom-line results of a mill through better recovery as opposed to increasing mill throughput. For a mill operation realizing 10 percent profitability, a 5 percent increase in throughput only increases profits by 5 percent; whereas, a 5 percent increase in recovery will increase profits by 50 percent, all other factors being equal.

At West Fraser Mills, LDT. implementation of the system has resulted in 15 percent of the lumber being under 20 percent moisture content, dryer savings of $7.00 per 1000bf, a 3 percent reduction in trim loss, and an $18,000 savings in planer downtime. Total savings are estimated at $2.66 per 1000.

CONCLUSION

Forintek has developed a practical solution to the long standing problem of variation in green moisture content. Novax Industries Corporation has translated that solution into commercial reality with 5 operating infrared sorting installations in the Pacific Northwest within one year of commercial availability.