

Canadian Forest Industries, April 2001

Difficult Decisions

Fibre allocation optimization is the next frontier in our industry, and by this time next year will be the latest buzzword. Some players are jumping in early.

Life used to be simple. You'd cut down a tree and send it to the nearest mill, whether pulp or sawmill and regardless of log size. Things have become a little more complicated over the past 20 years or so – fibre exchanges have become common between pulp and sawmills, bringing better resource utilization, and other players like OSB and veneer mills are often part of the equation.

Yet, the process of deciding which logs or log segments to make and where they should be sent, as well as when those parameters should be changed, is still mostly a manual, touchy-feely operation compared with other industries (petroleum, auto parts supply). The decisions might be good, but we don't really know whether they are optimum.

Thanks to shrinking margins, demanding investors, industry consolidation, readily available technology, and a shift from commodity to customer-driven production, that is about to change. The next few years will see companies investing much more time and money in making optimum fibre utilization decisions.

Getting started

Weldwood of Canada has already embarked on this unknown voyage at its Alberta operations, based out of Hinton, Gateway to the Rockies. Weldwood hopes to harness resource allocation

optimization to manage the flow of fibre to its growing list of mills. Two operations in Hinton lead the list: a kraft pulp mill that produces some high-end grades and a modern two-line sawmill producing 240 million bdft of dimension lumber targeting Japanese and premium square-edge grades. Also included are a modern small-log veneer line and LVL plant in Rocky Mountain House targeting high-strength lodgepole pine, another modern two-line sawmill in Sundre, and a fence-post/treating facility in Sundre.

Throw into this mix a large and widely varied wood basket, complex logistics (mills are close enough for exchanges, but not without complications), some fibre exchanges with other companies, the vagaries of the pulp market and that sector's new-found commitment to managing capacity, multiple and changing markets for solid wood with a broad range of prices and margins (Japan, U.S., veneer, LVL, fence posts and all their potential grades), and numerous harvesting scenarios (CTL or full-tree; optimized or diameter break bucking, sorts and how many), and pretty soon conventional wisdom and decision-making get lost in the dust.

Dennis Hawksworth, VP, Hinton Forest and Wood Products, anticipated the complexity in fibre supply soon after Weldwood acquired the Sunpine operations in 1998. He persuaded the company to create a new position in Alberta responsible for developing the tools and processes required for optimum fibre allocation planning. For the past two years Bryon Muhly, appropriately titled manager of resource optimization for Weldwood's Alberta operations, has been charged with making these increasingly complex decisions. The 23-year forestry

veteran isn't too keen to continue with just pen and paper. "With this many variables, you can either include them all in your decision-making process, ignore them, or generalize them, which I don't think we can afford to do anymore. We need to find a way to determine which log should go where in a more objective manner, and that means quantifying the alternatives. Once you can do that for the existing set-up, of course, you can start to see even more possibilities and strategies, which is where it gets really exciting."

For over a year now Weldwood has been using computer-based linear programming as a way to sort through these variables, quantify the alternatives, and find the best bottom-line solution. And bottom line means maximizing profits for the entire Alberta operation, not just each mill separately. Neither linear programming nor this company-wide optimization strategy are new. You have probably taken and forgotten much of the math involved long ago in high school or college, and the concept has been applied to the petroleum industry for decades. But advances in computer power, user-friendly interfaces, and, above all, industry consolidation and a pressing need to squeak more margin from every possible source is starting to focus industry attention on fibre allocation optimization.

While each company scenario and respective solutions will be by their nature uniquely challenging, companies like Weldwood don't have to re-invent the wheel. Experienced supplier/consultants exist, with two of the better known ones being Decision Dynamics (recently purchased by sawmill optimization company Perceptron and added to its suite of mill-

wide optimization products) and Canada's own HALCO Software Systems, best known for its widely used SAWSIM sawmill simulation software.

For its venture, Weldwood has partnered with HALCO, a company that has worked on similar, if not quite as ambitious allocation optimization projects in B.C., Alberta and the U.S., and has started working with another western Canadian operation on a project similar to Weldwood's. The plan is to establish a simulation model of Weldwood's Alberta operation, including woodlands, transport, processing mills, and markets. It would be fed as much known data as possible, as well as a few assumptions. More precise data will continue to be fed into the model as it becomes available, as will new variables like specific log quality attributes. For now a basic model is up and running, and Weldwood is testing it. The Alberta operations have an advantage, since much of the initial model development work was completed, under the direction of Hugh Robertson, for use by the company's central B.C. operations.

Managing change

Once a basic, valid model is established, values within it can be easily modified to determine the best resource allocation or investment decisions, as well as combinations of the two. Even after the model is tweaked, and optimum operating parameters established, the model can help Weldwood respond to changing external conditions, to help determine whether the operation should vary the existing log flow or processing methods (i.e. a glut in the pulp market, a large fire or bug kill area, a customer request for 2x5's, new possibilities for back haul, etc.)

A combination of modern processing speed and an established

model will allow Muhly and his staff to quantify the impact of any number of variables on the total operation bottom line in a matter of hours or days (if new programming were needed), exercises that would take months or longer if done conventionally. Muhly notes that this is the kind of flexibility and analytical skills his operation will need to prosper.

"The business is becoming more complex right through," Muhly says. "You can see it in the number of sorts and the growing demands on log quality and lumber quality – and this is only the beginning. Our whole system is already so dynamic with the multiple mills and products, that if you change the consumption or log specs of one mill, it impacts the entire system. A change in consumption at the pulp mill, for example, changes the fibre supply and economics of all the other mills, and with the industry's commitment to controlling capacity, that looks like it will be a fact of life around here. Add to that the move to more customer-driven solid wood production rather than pure commodity, and it's a tough balancing act at the best of times."

Once the system is able to balance variables and respond to market changes, Muhly sees some really exciting potential in the ability to optimize existing practices, or test new technology. The model can help evaluate everything from product-based bucking decisions in the woods to justifying spending more money on log quality, multiple sorts, or CTL logging as well as helping to target capital investment. The potential applications might be limited only by our imaginations, but Muhly cautions that making the model is only one part of the project. In practice, such things as organization

structure, day-to-day fibre flow management, and even performance incentives can create roadblocks to true fibre allocation optimization, and have to be carefully restructured. "If you're optimizing between a number of mills and supply areas, you have to be organized so that the results of your model are allowed to happen. To do FAO (fibre allocation optimization) properly, you end up sub-optimizing some mills to truly optimize the entire system, so you have to be organized in your decision-making hierarchy to allow for objective analysis that is above any particular mill needs. The mills themselves cannot control the fibre flow as many now do, because few mill managers will be interested in trading away 'his' best logs to help optimize another mill."

Needless to say, performance incentives based simply on mill production or recovery might have to be adjusted to some type of sliding scale or flexible system that recognizes the challenges faced by the mills getting the lower quality wood, or the advantages of those fed the cream. As well, things like logging contractor rates and bonuses need to be examined carefully to ensure they reflect the new resource allocation goals.

Other things to be put in place include excellent and detailed forest inventories, as well as a GIS-information system that is easy to use and able to export a lot of the useful information (when and where what type of fibre will be available, as well as various roading costs) to be used in the model. Weldwood has recently contracted Linnet to implement its Woodlands – The System to put all the company's forest management systems under one umbrella, and to create a more available, user-

friendly, and consistent data source across the supply area. In the end, the model is only as good as the information used to build it.

As well, the people steering the process, like Muhly and his two assistants, Paul Hostin, responsible for development of the LP model, and Grant Burkell, responsible for improvement of forest inventory information, need a firm grip on mill log inventories, trades, and impending deliveries. Otherwise, it is difficult to use even the best model to drive the big-picture log-use decisions without running mills out of wood in the process because of the challenges of day-to-day log supply. To this end, Weldwood is implementing local supplier Alldata's log inventory management system. The idea is to give decision-makers almost immediate knowledge of log inventory and flow, so that the impressive plans can be turned into a working reality.

It's far from simple, and there is a cost. So it's not for every operation. As Muhly points out, companies need a certain scale and enough variation in the wood supply and potential product values to make the time and effort pay off. And they need to understand their operations and fibre flows very well (although building a model will improve that knowledge).

In other words, it's not business as usual. But then Muhly and the folks at Weldwood feel that business as usual no longer exists.

"People talk about exponential change occurring in the forest industry, but in the past year or so it has been just phenomenal. I've been in this business for 23 years and I've never seen anything like it. We're undergoing fundamental

changes in marketing and strategies – from commodity to customer focus and product segmentation in both solid wood and pulp. To do it effectively you have to start with the basic fibre resource. What do you have, what are the markets, what can you, or should you, produce? We have to be able to understand it thoroughly, and predict it accurately.”