SAWSIM®-LP

Production Planning Optimisation System

HALCO Software Systems Ltd.

The Challenge

Sawmill production planning is a difficult challenge. At one level, the question is:

- Which sawing pattern, or patterns, should be used for each log sort, to produce a required production mix in the most efficient way?

But to truly optimise a sawmill operation, there are many more questions:

- What should the production mix be, considering market opportunities and our production capabilities and constraints?
- What logs should we purchase?
- What lumber finishing options (ripping, treating, and grading optimiser pricing strategies) should be used?

Ultimately, an optimal production plan must resolve many trade-offs, for example between recovery, sales value, and production rate. And while mill personnel are aware every day of the need to resolve these trade-offs, the complex interactions in the lumber manufacturing process make it very difficult, if not impossible, to know whether a production plan is truly optimal, often resulting in "ad hoc" operating decisions.

The SAWSIM®-LP Solution

HALCO's **SAWSIM®-LP** System combines our SAWSIM® Sawmill Simulation Program with linear programming (LP) optimisation.

LP is a widely-used method to determine the optimum allocation of raw materials and production methods to optimise the profitability of manufacturing processes. LP is perfectly suited to the production planning problem in a batch-run sawmill.

> **An optimal production plan must resolve trade-offs between recovery, sales value, and production rate**

Benefits

Key benefits from use of **SAWSIM®-LP** include:

1. Increased recovery, resulting from:
   - Overall better pattern selections to satisfy a production mix requirement; and
   - By having a better plan, avoiding use of "panic" pattern selections to fill an order.
2. Increased average sales price, from:
   - Working with your sales department to develop plans to sell a higher-valued mix.
   - Minimizing production of undesirable products, which must be discounted to clear.
3. Reduced finished product inventories, by better matching production to market demand.
4. Improved ability to satisfy orders, on time, resulting in increased customer loyalty.
5. By having a systematic method of preparing routine production plans, improved ability to take advantage of shorter-term market opportunities.
6. Improved log purchasing, from better knowledge of the true value of logs by diameter and length class.
7. Better integration of log purchasing, mill operations, and finished product sales; improved inter-department communication.

HALCO Software Systems Ltd.

Vancouver, Canada

604 731 9311

www.halcosoftware.com

"What-if..." Analysis

In addition to routine production planning, **SAWSIM®-LP** is also used for longer-term planning (for example, annual budget planning) and for "what if" analysis of log supply, lumber marketing and proposed mill capital projects.

SAWSIM®-LP Components

1. SAWSIM® Sawmill Simulation Program

With over 30 years of development, SAWSIM® is widely considered the industry-standard sawmill simulation program, the world over. In a **SAWSIM®-LP** system, SAWSIM® is used to generate "yield data" for processing each sawlog class with all possible sawing patterns.

The SAWSIM® yield data includes the rough-sawn volume of each product size and length, the processing time at each machine centre, and byproduct yields. SAWSIM® considers "true-shape" log form, and includes consideration of typical mill piece alignment characteristics and other production imperfections, so that the yield data accurately reflects actual mill performance.

2. Linear Programming Matrix Generation

The **SAWSIM®-LP** matrix generation and solver combines the SAWSIM® output with additional financial and operational data, and determines the optimum solution. The solution includes the optimum production mix, and the "sawing pattern recipe" – the sawing pattern (or patterns) to use for each log sort, to produce the optimum production mix in the most efficient way.

SAWSIM®-LP considers the available sawlog mix. The user can choose to fix the log mix, or to allow the optimum solution to deviate from the original mix proportions, up to a specified level. Maintaining proportionality in the sawlog mix may be important, to prevent the system from "creaming" the inventory (for example, using the best sawlogs to fill immediate orders, always leaving smaller sawlogs behind). However, by allowing deviation from the starting inventory, the user can evaluate the potential benefits of alternative log mixes.
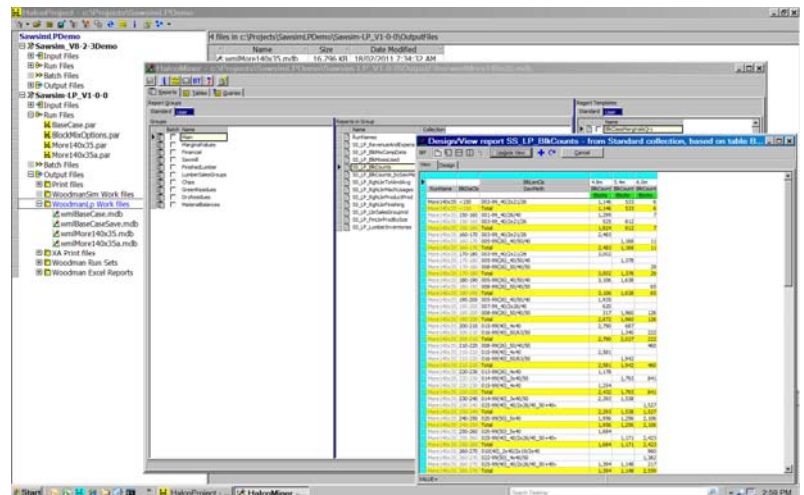
3. Data Management and Reporting Tools

To be used effectively, applications like **SAWSIM®-LP** must be "slick", meaning:

- Data entry, including selection of data from external database sources, must be straightforward, within a well-designed, robust database system; and
- There must be as few manual steps as possible.

HALCO's comprehensive and time-tested data management tools satisfy these requirements.

HALCO Software Systems Expertise

HALCO is uniquely qualified to provide an integrated production planning optimisation system such as **SAWSIM®-LP**. For such a system, use of a comprehensive simulation program such as SAWSIM® is an absolute must; relying on mill test or production data will not do.

HALCO's analysts have many years of experience modeling forest industry operations the world over. We have the expertise to ensure a successful implementation, regardless of the unique details of a particular operation.

HALCO Software Systems Ltd.