Push vs. Pull Model Analysis Using CT Log Scanning

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Should a sawmill prioritize maximizing yield or producing exactly what customers require? Idaho Forest Group (IFG) maintains its competitiveness through a combination of production-driven (push) and sales-driven (pull) strategies. Finding the right balance, however, is not easy. This study examines how technologies such as CT log scanning and simulations can help optimize decision-making and increase productivity and profitability.

Initial Situation & Objective

IFG is a family-owned lumber company operating six sawmills across the United States, producing over a billion board feet annually. As a key player in the American lumber industry, IFG balances efficiency and market responsiveness, operating with a mixed push-pull strategy of approximately 55% pull and 45% push in total production. While a push strategy focuses on maximizing material yield, a pull strategy aligns production with customer demand. The ongoing challenge lies in refining these strategies to sustain profitability and competitiveness.

To address this, the study analyzes push and pull models using advanced X-ray computed tomography (CT) log scanner technology, providing insights to optimize IFG's production strategy. The goal is to develop a balanced model that maximizes product value while maintaining flexibility to respond to market changes. Achieving this should enhance profitability and improve customer satisfaction.

Method

The study analyzes 500 Hem Fir logs with varying diameters and lengths. These logs were processed at the Lewiston (Idaho) facility using the CT log scanner, which captures detailed internal images to ensure precise measurements and accurate data collection. Data from the scanner is used in simulations to assess different models, incorporating various product grades and scenarios to maximize production volume and value. The study examines four simulation scenarios: one representing a pure push model and three exploring hybrid push-pull strategies. To enable direct comparison, one hybrid scenario reflects IFG's current strategy, maintaining a 36% pull and 64% push balance for Hem Fir production in Lewiston. The evaluation considers factors such as product dimensions, market prices, and historical pricing data, aiming to identify the most effective strategy for balancing volume maximization and value optimization.

Results

The analysis highlights that a predominantly push strategy maximizes productivity by achieving high material recovery rates. However, this approach risks profitability due to inventory misalignments. Pull strategies, on the other hand, demonstrated superior profit margins when targeting customer-specific demands, especially when considering price variations in a pure push model. Among the hybrid models evaluated, the Natural Pull strategy proves to be the most effective. This strategy includes Home Center products, which are associated with pull, without any trimming to meet specific Home Center requirements, resulting in a configuration of 27.5% pull and 72.5% push. Key findings include enhanced operational flexibility and an improved profit margin.

Conclusion

The study emphasizes the significance of integrating advanced analytics and real-time data in production workflows. Future research directions include adopting AI-driven forecasting tools to further enhance precision and sustainability while maintaining customer focus. These insights contribute to a framework for increasing efficiency, adaptability, and profitability in the timber processing sector.

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IFG's CT Log Scanner at the Lewiston facility in Idaho, USA