

Trim Optimization: Enhancing Efficiency in the Paper Industry

Max Rüber, Head of Sales, Pulp, Paper & Fibre, Tietoevry Industry

INTRODUCTION:

In an industry where margins are tight, sustainability is paramount, and customer demands evolve rapidly, one of the paper industry's biggest opportunities lies in optimizing production processes. One area that continues to present opportunities for improvement is trim optimization — the process of reducing material waste during the cutting phase of paper production. As companies strive for efficiency and sustainability, advancements in trim optimization software, after a time of standstill, have emerged as a crucial tool for staying competitive.

The Challenges of Trim Optimization

Trim optimization involves cutting large parent rolls of paper into smaller rolls or sheets to meet customer specifications. While this sounds straightforward, the complexity arises from the myriad of constraints, such as varying customer demands, machine limitations, and the need to minimize waste. But that is not all – during and after the actual production, optimization needs to take into account real events, quality and incidents to ensure overall trim efficiency. Poor optimization can lead to over- and underruns, increased material waste, higher operational costs, and longer machine running times, all of which impact profitability and environmental performance.

Traditional trim optimization methods often fall short in addressing these challenges comprehensively. Rigid algorithms and limited computational power have historically constrained the ability of older systems to deliver truly optimal solutions. As a result, many mills find themselves grappling with excessive trim waste, inefficient machine utilization, and suboptimal resource use.

The Role of Advanced Algorithms and Solvers

Recent technological advancements have significantly improved the potential of trim optimization solutions. By integrating more sophisticated algorithms and leveraging commercial solvers, modern software can tackle complex datasets with higher accuracy and speed. These improvements allow for:

- **Reduction in the Number of Patterns:** Simplifying the cutting process by reducing the number of unique cutting patterns helps streamline operations and improve machine setup efficiency.
- **Wider Average Converting Roll Widths:** Utilizing broader roll widths reduces machine running times and enhances throughput on sheeters, winders and other downstream converting machines.
- **Minimized Waste:** Even a small reduction in trim waste can translate into significant savings in raw materials and associated costs, including transportation and energy use.





The Potential of Artificial Intelligence

Integrating industry-specific artificial intelligence (AI) into trim optimization software opens up new dimensions of efficiency and insight. AI can continuously analyse vast amounts of operational data, including operator performance, product performance, and machine behaviour, to identify patterns and opportunities for improvement. For example, AI can suggest optimal cutting strategies (pre-trim) in real time, adapt to changing production conditions, and predict maintenance needs to minimize downtime. Furthermore, AI enables enhanced decision-making by providing actionable insights into operational efficiency and sustainability metrics, ensuring that mills can consistently achieve the best possible outcomes.

Sustainability and Cost Savings

The environmental impact of reduced trim waste cannot be understated. Lower material waste means less energy and fewer raw materials are required, leading to reduced carbon emissions throughout the supply chain. Additionally, less waste translates to lower disposal (or re-usage) costs, which further enhances the bottom line. These benefits align with the growing emphasis on sustainability within the industry, providing both ecological and economic advantages.

A Step Forward in Optimization

Tietoevry's latest trim optimization solution – Trim25 – represents a leap forward in addressing these challenges. By improving the algorithm and incorporating a robust commercial solver, we've achieved measurable improvements over existing solutions in the market. Compared to competing software, our solution offers among other benefits:

- A streamlined process with fewer patterns resulting in less machine time and an increased production efficiency.
- Optimizing the utilization of the converting process through wider average roll widths further increasing production efficiency.
- A notable reduction in initial trim as well as the overall trim efficiency.

These advancements are not just about outperforming competitors; they're about empowering the paper industry to operate more efficiently and sustainably. With these tools, mills can tackle the twin challenges of profitability and environmental responsibility more effectively than ever before.

Trim optimization, though often overlooked, plays a vital role in driving the paper industry forward. As technology continues to evolve, embracing advanced solutions will be key to staying ahead in an increasingly competitive and sustainability-focused landscape.



Author: Max Rüber, Head of Sales, Pulp, Paper & Fibre, Tietoevry Industry