Breaking down the barriers of nesting efficiency in composite cutting

Switching from the concept of 'point solution' for nesting software to an 'enterprise-level solution' that broadly looks at the whole cutting process is today's only option for manufacturers looking to break down the savings barriers reached by traditional nesting solutions.

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When using production optimization solutions, raw material savings are increased by dynamic nesting, better use of remnants and mixing orders. Further savings are reached through an automated and more efficient process, including reduced set-up time, increased shelf-life, reduced human errors, improved quality and faster time to market.

The business challenge

Nesting software programs differ from one another by their ability to nest complex shapes in the most efficient and practical way. However, with the advances in nesting research, the nesting product category has reached a maximum level of efficiency, and the various competing products differ from each other by fractions of yield improvement. Regardless of how good these nesting software solutions are, they are all limited by design to a given quantity of product on predefined material of a specific length and width. Thus, the nesting software cannot and does not consider other relevant factors driven by the manufacturing reality, such as the material's expiration date, the remnants available in the warehouse and other incoming orders.

The solution

Breaking down the barriers of nesting efficiency requires a new approach: a transition from a 'point solution' to an 'enterprise-level' solution, which is able to generate comprehensive production plans on the fly, while considering all relevant information at once, including customer orders and requirements, material availability, machine capability and availability as well as product design.

A production optimization software program that implements such a holistic approach requires dynamic and creative optimization techniques to address production inefficiencies and to generate new levels of savings, beyond material only.

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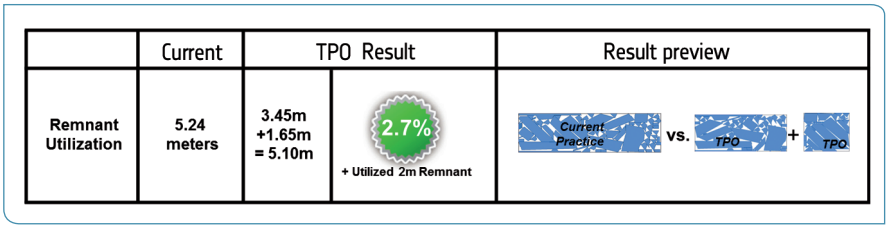

Fig. 1: Remnant utilization

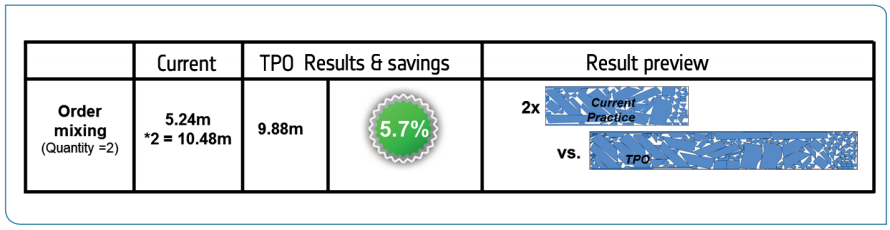

Fig. 2a: Multi-kit nesting (combined nest)

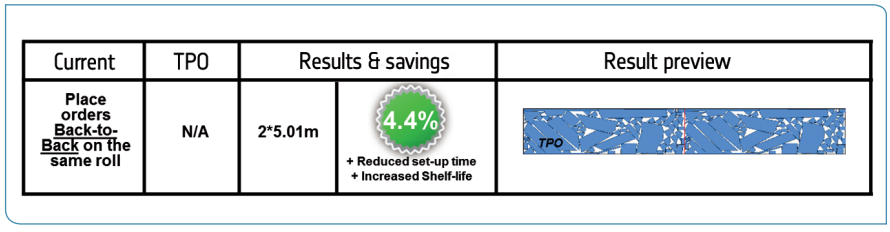

Fig. 2b: Multi-kit nesting (back to back)

The following examples discuss some of these techniques showing the savings provided by an 'enterprise-level' solution.

Remnant utilization

While nesting software can create the most efficient nest, the machine operator still needs to provide enough material for that particular nest. In such cases, any shorter rolls left in stock may not be used and will eventually expire. Taking a broader approach and using an 'enterprise-level' solution – which considers the actual material available in the freezer and nests a single kit over multiple rolls – allows using the short rolls in stock before they expire.

Figure 1 shows an example where a single kit is nested over two partial rolls. Initially, 5.24 metres of new material were used and now only 5.10 metres are required. So the yield is improved by 2.7%, and two rolls which would total a little more than 10% of a 50-metre roll are used instead of being discarded.

Multi-kit nesting

Often, two orders requiring the same material are cut from two different rolls simply due to a lack of communication between the orders platform and the cutting platform. A holistic approach integrates the production floor with the CAD and ERP systems, enabling the nesting of multiple kits together.

Figures 2a and 2b show two different examples of nesting two kits together. In the first instance (2a), the kits are mixed, thus maximizing the material yield. Instead of producing two separate kits each using 5.24 metres of material, the kits are mixed into a single nest and use 9.88 metres as opposed to 10.48 metres. This results in a further yield improvement of 5.7%.

In the second example (2b), the two orders are nested back to back, still improving yield but making the kits a little easier to pick from the cutting table. However, just like in the kit mixing example, since the role only has to be thawed once, it results in reduced labour and setup time, as well as increased out-time on the roll. ■

More information ...

Plataine's Total Production Optimization (TPO) software solutions bridge the gap between customer, manufacturing and engineering requirements. TPO integrates data from the ERP's order management and inventory warehouse modules, CAD software, and production floor systems to automatically create optimized production plans. Plataine's offers the TPO solutions on a Software-as-a-Service (SaaS) basis.

More information:
www.plataine.com