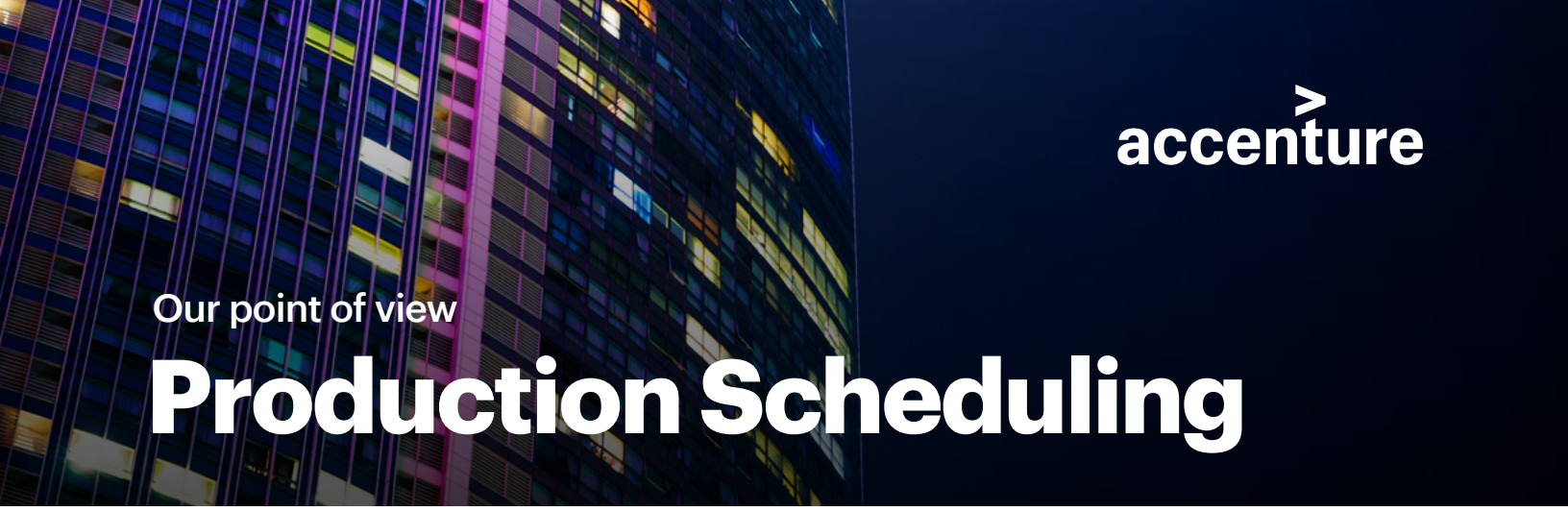


Our point of view

Production Scheduling

We often find management underinvests in production scheduling. They put more emphasis on long-term planning than on executing to those plans. While typically covering just a few weeks at most, the cost impact of a poor production schedule can still be profound.

Production scheduling is a tactical exercise to establish precisely what to produce and when. Schedules balance adherence to longer-term plans with filling real orders. Equipment disruptions or material availability issues often force firms to update schedules daily.

In practice, we see three steps to good execution:

1. **Fill customer orders per a defined prioritization scheme.**

2. **Control production costs by improving production sequencing.**

3. **Schedule quantities to match the governing longer-term plan.**

These objectives seem trivial to achieve, but there are several challenges. Production operations often involve hundreds of SKUs, produced in a sequence of stages over multiple production lines. The number of possible combinations for execution is huge.

Typical operations use rules of thumb for scheduling. While producing decent results, these heuristics explore few combinations and often achieve results far from the optimum.

Heuristics struggle with constraints like setup times. They also fare poorly when tasks compete for scarce resources like raw materials, production line time, or warehouse space.

We apply optimization techniques for scheduling. A custom model can identify solutions that optimize KPIs while satisfying business and operational constraints. A well-designed model can explore millions of combinations in a few minutes. Users can use up-to-date parameter values and solve the model weekly, daily, or even on demand. The model can also work as a what-if simulator. Insufficient capacity? How about adding a third shift? Or weekend overtime?

Case Study

A client had a good production planning process but faced execution issues. Their manual process relied on several disconnected spreadsheets.

Setup times depended a lot on the production sequence. Producing SKUs with colors from light to dark meant far shorter cleaning times between runs. Plant management advocated for long production batches following the preferred sequences. While minimizing production costs, this strategy resulted in excess inventory. They once had to stop production because they ran out of warehouse space!

An optimized production schedule was introduced to balance several factors:

- High production line utilization
- Limited warehouse space
- Late orders
- High setup times and costs

The optimization model found solutions that slightly increased production costs but improved on-time deliveries and reduced working capital.

Figure 1 - Before.
Batches always scheduled from light to dark

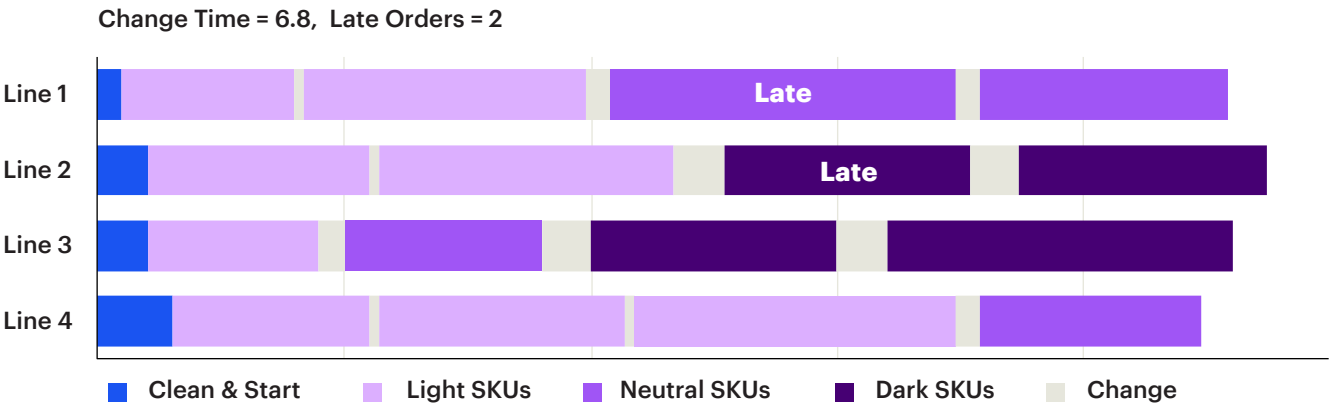
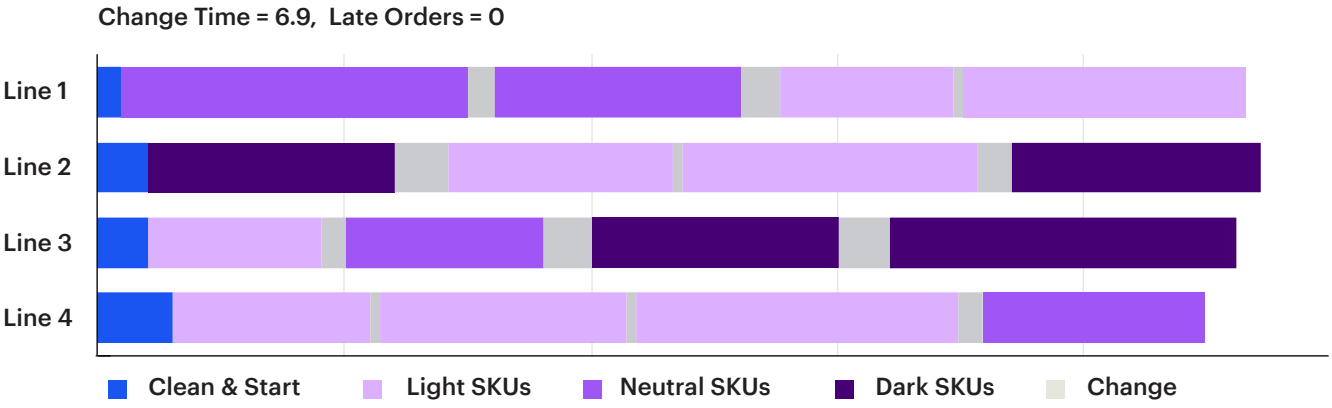


Figure 2 - After.
Optimized schedule reduces late orders and inventory



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