How Simio's Risk-based Planning and Scheduling (RPS) Augments Advanced Planning and Scheduling (APS)

What is APS?

Advanced planning and scheduling (APS) simultaneously considers limited material and finite resource capacity to plan production. APS employs advanced logic, optimization, or simulation to generate plans/schedules that account for the constraints in the production system. APS can be used to project the effect of new orders and material/resource problems on meeting production goals.

What is RPS?

Simio's Risk-based Planning and Scheduling (RPS) product uses a discrete event simulation model to generate both a detailed resource-constrained deterministic schedule as well as a probability-based risk analysis of that schedule to account for variation in the system. RPS is used to generate production schedules that minimize risks and reduce costs in the presence of uncertainty.

How does RPS differ from APS?

APS generates production schedules by assuming there is no variation or uncertainty in the system. A deterministic APS schedule quickly becomes obsolete as machines break, processes vary in time, material arrives late, etc. APS schedules which appear initially feasible become infeasible over time as variation degrades performance. By ignoring variation APS schedules are optimistic by nature - they promise more than can be delivered. The user of traditional APS has no way to assess or mitigate the underlying risk inherent in the schedule. RPS augments the deterministic APS schedule with risk measures that allow the decision maker to properly account for the underlying variation and uncertainty in the system.

How does RPS work?

RPS uses a purpose-built discrete event simulation model of the system to fully capture both the detailed constraints and variations in the system. RPS then uses this model in two ways. The first is to generate a detailed schedule/plan. In this case the model is executed in a purely deterministic mode; machines do not break, process times are always constant, materials arrive on time, etc. This is the optimistic view assumed by all APS systems and produces a deterministic plan/schedule. Once the schedule has been generated RPS then replicates this same simulation model with variation turned on and performs a probabilistic analysis to estimate the underlying risks associated with the schedule. The risk measures generated by RPS include the probability of meeting user-defined targets, as well as expected, pessimistic, and optimistic schedule performance.

What are the benefits of RPS?

By providing up-front visibility into the inherent risk associated with a specific plan/schedule, RPS provides the necessary information to take early action in the operational plan to mitigate risks and reduce costs. RPS provides a realistic view of expected production schedule performance. Specific alternatives such as overtime or expediting external material/components from suppliers can be compared in terms of their impact on both risks of meeting schedule targets, and costs of mitigating those risks, thereby providing a customer-satisfying operational strategy at a minimum cost.

Are there other uses for my RPS simulation model?

RPS uses a purpose-built model of the system to simulate the flow of a specific set of orders. The orders to be scheduled are typically downloaded to RPS from the ERP/MRP system. The same simulation model that is used by RPS can also be used to analyze and improve the design of the underlying production system by randomly generating orders over a long planning horizon. For example, the model could be used to evaluate the long-term impact on performance of capital equipment purchases, changes in process flows, or new product introductions. Hence, the same simulation model can be used to both improve the facility design as well as provide the detailed model logic for planning/scheduling of day-to-day operations.