

Carte Brings Order to the 'Significant Third' Concept

BY GEORGE SCHULTZ

Neither a job shop nor a repetitive manufacturer, Carte International (Winnipeg, Manitoba, Canada) had to find a distinct production software system to help bring long needed order to its operations in what it calls the 'significant-third' manufacturing concept: make-to-order.



Evelyn Clarke and Nino Raimondi of Carte production control team were instrumental in making the software-driven scheduling system a success.

Eschewing "true" MRP II systems, the manufacturer and international supplier of electrical distribution-class transformers adopted automated finite-capacity scheduling. "We could really see our way through how using finite-capacity scheduling fit the way we did our work, and that it would be feasible in limitation with definable results," says Harold Peters, vice president of manufacturing and information systems. Carte chose JobTime Plus software, a computerized scheduling system developed by JobTime Systems Inc. (San Mateo, CA), for planning and managing production. The program takes into account a complicated set of real world factors and builds a simple, straightforward, plant-wide schedule of daily tasks and jobs, covering all resource and sub-job constraints.

Carte, with a present plant work force of 114 was already a successful maker and international supplier of electrical distribution-class transformers. Yet it was running into late deliveries and excessive work-in-process (WIP) inventory. Bottom line: it was not using resources to capacity, especially when it counted most during a recession. Carte manufactures its transformers from raw material to finished product. This comprises virtually all components, from the metal tank or shell of transformers to the internal elements that serve the voltage-reduction functions, such as the core and coil assembly. This excludes only small external parts, switches and bushings which are out-sourced. All this translates into detailed planning and intricate scheduling of up to 8 to 10 major stages or sub-jobs for each contract under. Moreover, each sub-job entails from 5 to 10 tasks, directly affecting production routings for the many variations.

These transformers are the familiar "boxes" seen along transmission lines, where electricity enters users' premises. Their external dimensions range from 24 by 36 in. to 8 by 12 ft. Because there are no national standards for transformers, each electrical jurisdictional body—a utility, or a state or local government—dictates its own requirements.

Variations among Canadian provinces which account for 90% of Carte's sales—are much greater than those among U.S. states, laments Peters. What this means to

transformer production, Peters explains, is that basic materials may be identical, but their assembly and engineering are virtually unique to each order.

This is why Carte's quest for a scheduling system fit neither that of a job shop's unique engineering and production, nor the off the-shelf production-supply approach of a repetitive manufacturer. At best, Carte's scheduling could utilize the bill of materials from a previous job while assiduously incorporating numerous "exceptions" required by specific engineering for the present order. This led Peters and his colleagues to the theory that besides the two "accepted" manufacturing concepts at that time-job shop and repetitive-there was a "significant third" one emerging. It fit Carte's assemble-to-order or make-to-order operations, with sufficient emphasis on finite capacity and forward scheduling.

JobTime's finite planning and scheduling, which uses event simulation, fit the bill and the system went online, and Carte International and achieved reduction in work-in-process inventory and reduced cycle times fairly quickly. Now, over two years since implementation, changes can be measured in healthy, supportable specifics: On-time delivery has improved approximately 25%, and productivity is increased by 20% (partly accounted for by concurrent downsizing). Further, plant capacity utilization improved about 5%, which Carte feels is significant in a make to-order facility.

But along the way, Carte had to define its manufacturing concept.

As Peters now recalls, "Job shop is a true 'one-out' kind of shop, where all of the material and routings and product times are unique to the job. That was not our case: we actually assemble and engineer to order in a specific product. line. But at that time, we were still considering ourselves a job shop, because we certainly were not repetitive.

"We already were scheduling on the floor-intuitively, which is to say we knew each work center had finite capacity and we tried to schedule everything. "what it was causing-and this was effective in the [pre-recession] 1970s and 1980s-was tremendous amounts of WIP," Peters remembers. 'WIP was used to take care of all types of problems, and that included quality defects, line imbalances, moving bottlenecks and by WIP I mean stuff piled to the ceiling. We're talking two weeks of WIP in front of each of the assembly areas!"

And now, after finite capacity scheduling implementation? "Now, at the end of the day," answers Peters, "it looks like everything is empty because the product just flows, and there is never more than a little bit at each work center. And yet the throughput is still there."

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