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# customer demands



BY LYNNE BAIRSTOW, FEATURES EDITOR

## why you should consider a "flow manufacturing" strategy

»» **T**o remain competitive, companies today have to respond quickly to changes in the market and customer demands. The manufacturing environment as a whole is seeing a trend toward make-to-order and mass customization, which increases process and planning complexity, especially in the areas of production sequencing and scheduling.

It is this shift from traditional to complex or even more intrinsic relationships with customers that is providing manufacturers with their biggest challenges—how to produce quickly, efficiently, and flexibly to meet the new types of demands.

In these complicated manufacturing scenarios, enterprise resource planning (ERP) alone is often insufficient to forecast demand adequately and align production accordingly. Advanced planning and scheduling (APS) systems are considered as one way to optimize the planning process.

APS extracts data on a realtime basis from the enterprise to provide decision-making support for production scheduling and execution. Today's systems have the speed and capacity to process this information in a matter of minutes, where as recently as two years ago, this was impossible without a major capital investment.

Traditional MRP (material requirements planning) and ERP systems were simply too slow or too costly to provide the information accessible today through APS.

### APS maybe

Manufacturers can no longer afford long production runs and inventory buffers. Flow manufacturing is a

strategic system that is gaining momentum as an alternative, or complement to traditional manufacturing and its related tools of MRP, ERP, and APS.

Flow manufacturing focuses on quality and product cycle-time issues in the basic design of production, thus simplifying execution and management issues. Flow manufacturing is used as a solution when more sophisticated planning algorithms simply cannot fix an underlying architectural problem in manufacturing production.

"APS really evolved in an effort to fix a problem that was created by MRP and its lack of flexibility as to what was able to be manufactured on a day-to-day basis," explains Karin Bursa, vice president of marketing, American Software, Atlanta Ga. "Flow results in highly flexible, highly responsive manufacturing that can take a 12-week manufacturing schedule down to literally a matter of hours."

"Flow ends up simplifying operational basics," states Tom Grace, senior analyst of the Manufacturing Strategies Group at AMR Research, Boston, Mass. "The companies using flow today are using it because it is an operational tool—it really changes how they run their factories, and in many cases they find they don't need APS, or need it very little. APS tends to add another algorithmic layer to the equation," he explains. "Once flow is implemented, the companies often find there is no need for an APS system."

"Having said that," he continues, "...it's important to add that flow is not for the light-hearted—it involves a significant commitment, including educating the shop floor on a new operational system, as flow involves a whole different style of factory management."

# “today, to support ongoing change, you need the standardized software.”

## What is flow?

Flow manufacturing is both a business process and a manufacturing method that bases daily production on demand rather than schedules and forecasts. The goal is to rapidly respond to customer demand and order changes—making any given product on any given day—and keeping inventory levels to a minimum.

A process that maximizes flexibility and optimizes throughput, flow manufacturing was pioneered by the John Costanza Institute of Technology (JCIT), Englewood, Colo., in the mid-1980s.

Rather than an IT-driven (information technology) solution, flow manufacturing requires an entire rethinking and overhaul of the shop-floor layout, including reorganizing equipment by products that share processes. Other names for flow techniques include lean, agile, just-in-time (JIT), continuous flow, and Toyota Production System.

The key difference of flow manufacturing is that it uses a pull strategy to move goods based on customer demand, rather than the traditional push strategy, where production levels are determined by scheduling and forecasting tools—often inaccurate ones. The difference is that there is no chance of buildups in inventory.

The five key components of flow manufacturing, as based on the JCIT methodology, are flexible line-design tools, operational method sheets, flow demand management (demand smoothing), the use of kanban signals to replenish supplies, and flow production execution.

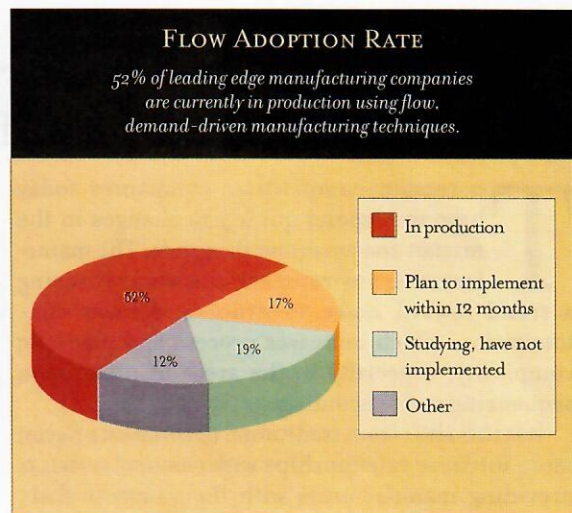
But what does this mean to the bottom line? Where traditional enterprise management solutions, including ERP, SCM (supply-chain management), and APS offer greater decision support through improved knowledge, flow manufacturing aims to reduce inventories significantly—by as much as 50-90%, improve equipment capacity from between 30-40%, and reduce cycle times by more than 70%.

The primary objective is to produce the highest quality product at the lowest possible cost in the shortest possible time, driven by demand. Radical promises? Yes, but remember, it entails revolutionary changes in both the manufacturing methodology as well as overall business practices. Still, for certain industries and specific companies, the payoff can be rapid and significant.

## Why now?

To date, organizations have been slow to support flow manufacturing, as they have been busy focusing their efforts on MRPII (manufacturing resource planning) and then ERP systems, augmented by APS systems as computing capacities increased.

Because adapting flow manufacturing requires a reorganization of the shop floor, companies are



reluctant to change everything without first implementing the concept on a limited trial basis.

A key reason that companies have been slow to adopt this seemingly more efficient mode of manufacturing is that software to help manufacturers support and automate the process has not been available outside of expensive, highly customized solutions.

ERP standardization has been the directive, and without solutions that can work within this framework, corporate IT resisted supporting flow manufacturing. Companies that have used flow thus far have relied on spreadsheets and internally developed packages to handle its components.

“It’s important to remember that flow has been around for awhile—or at least the methodology,” comments Grace. “In the past, people approached it as a set of calculations. Today, to support ongoing change, you need the standardized software.”

According to a February 1999 AMR report authored by Grace, entitled, “ERP and Flow: the Status Quo Meets its Replacement,” he says that what has held back the acceptance of flow thus far

# "flow manufacturing enables companies to bring products to market faster."

has been a lack of commercial software stable enough to accelerate the implementation of flow manufacturing. "Standard tools could institutionalize consistent flow-manufacturing practices across the entire business, but such products are just hitting the market."

Another shortfall of traditional flow solutions has been their lack of ability to integrate manufacturing information with the rest of the enterprise, since operations beyond the shop floor are also impacted by this change in business practice. Engineers design differently, and sales and marketing people forecast differently, under the discipline of flow-manufacturing. Unlike an ERP system, implementing a flow-manufacturing strategy alters how departments work together as well as the core operation of the plant floor. It is not a one-time design exercise but a dynamic process.

"Flow closely aligns with new engineering for manufacturing initiatives that strive to bring together these two components—and this enables companies to bring products to market faster," says Grace. "Flow puts in place the methodology that allows this to happen. You can look at a particular product and see the equipment, line, tools, and materials needed to manufacture it. That kind of thinking can cut months off of a product's introduction time."

## Who is "going with the flow?"

According to AMR's Grace, "The best case applications are in the automotive parts and high-tech electronics industries, or anywhere where people are trying to build fairly aggressive volumes of figure-to-order products. This is where flow is pretty appealing."

"Those industries moving most quickly toward flow are high-value, discreet manufacturing companies with multiple products," states American Software's Bursa, who seconds Grace's observations.

"Markets that are really embracing flow manufacturing include high-tech electronics, which have a short shelf life; the auto-supplier market, where there exists great pressure to be cost-effective; industrial products, such as motors and valves; and medical equipment, which involves a high-value end product, in many cases manufactured to customer specifications."

In the AMR report, Grace states that the pilot

market alone for flow methods could approach \$150 million by 2002. The report contends that flow manufacturing may be a perfect add-on opportunity for plants resisting a new ERP implementation.

## Flow manufacturing

Even among the emerging application leaders in this market, what is lacking, according to the AMR report, are active references and reasonable pricing strategies. In addition, flow manufacturing needs to coexist with ERP, as ERP will continue to be important for critical planning and back-office functions.

Of the large ERP players, both Oracle, Redwood Shores, Calif., and SAP, Walldorf, Germany, are now supporting flow in their offerings, respectively in version 11.0 of Oracle's ERP package and SAP's version 4.0 of R/3.

However, the company making the biggest impact in bringing this innovation in manufacturing to the mainstream is American Software, which has emerged as the clear leader in off-the-shelf support for flow manufacturing. In addition to its Flow Manufacturing product, its new ERP-flow product, Intelliprise, runs on Microsoft Windows NT and more traditional platforms. (Originally released as a Unix and AS/400 system product in April 1998, it added a Windows NT version in December of last year.)

These products all came as a result of customer demand. In American Software's case, its flow solution was first developed in 1994, in response to the needs of its customer, American Standard. From this custom solution, the Flow Manufacturing product evolved to provide automated management of this manufacturing method.

American Software was the first-to-market with a dedicated flow-manufacturing solution that encompassed line design and balancing, demand smoothing, kanban management, engineering change management, method sheets, and product costing.

Flow Manufacturing is scalable, and can be used in manufacturing scenarios ranging from a single product line to a complex multiplant, multisource operation, and can be implemented along with most traditional MRP and ERP solutions.

In fact, last fall a strategic alliance between ERP leader JBA International, Rolling Meadows, Ill.,

# “the companies moving to flow manufacturing are those who are more aggressive...”

and American Software was announced. The product's graphical look and feel allows for drag-and-drop line design, on-the-fly what-if analysis, and rapid navigation to view information in the context of daily operations.

The Microsoft Explorer “look and feel” of visual flow provides an easy-to-use graphical manage-

## Who should consider flow?

“Flow represents the opportunity to go back to basics, states Grace. “It’s the kind of customer-centric approach that manufacturers are tending to favor today.”

His report observes that as companies strive for tighter customer relationships, they need to simplify manufacturing processes in order to achieve higher service levels, and this requires a change in fundamental strategy.

In Grace’s experience, most manufacturing people embrace flow once they have an opportunity to use it. “They are unlikely to get rid of traditional methods entirely, and there are still cases where APS can be a useful complement to flow. But typically they will find they can operate much faster and much more responsively than before.”

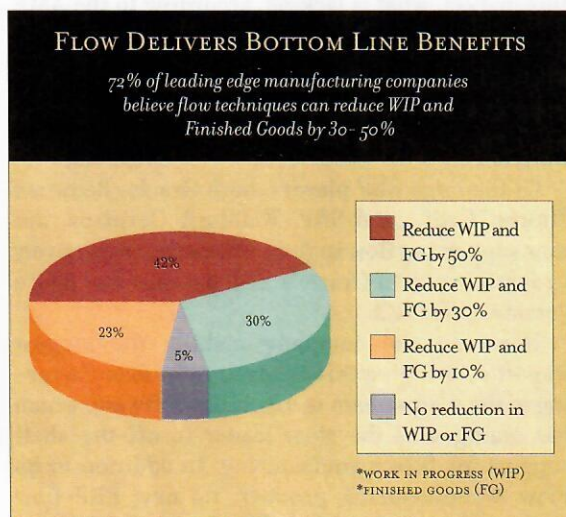
“It’s a very exciting time in this market, which is just starting to blossom,” says Bursa. “At this point, it is an adaptive, innovators’ market, where the industry itself is less important than the company. The companies moving to flow manufacturing are those who are more aggressive in manufacturing in a competitive environment.”

American Software has seen a mix of old-line companies that need to adapt to increased competition, and younger, more dynamic companies that are looking to sustain high growth levels.

“American Standard was one of the first manufacturers to move to flow manufacturing, even though you may not think of faucets and fixtures as being highly competitive products.” continues Bursa. “Due to the success they’ve had, now Kohler and Moen are interested in flow, in order to be competitive. If one vendor does it, and does it well, it can impact the entire industry.”

And for companies that have implemented or are considering a shift to flow manufacturing, APS can still be integrated into the management of the enterprise. Reductions in costs, lead times, inventories, and other bottom-line-oriented programs resulting from JIT or flow manufacturing improve company performance and improve production agility.

The primary benefits of an APS system impact the “top line”—improvements in customer service and increased sales. The two together make a potent combination for improved profitability. ●



AMERICAN SOFTWARE SURVEY, AUGUST 1997

ment option. Line design is as simple as drag-and-drop, and what-if analysis can provide information within the context of an operation.

One of the key advantages of American Software’s Flow Manufacturing product is that it enables flow techniques to be used for some portions of production and assembly while traditional MRP manufacturing is maintained for others. This provides companies with significant flexibility and the ability to transition away from MRP in a comfortable manner, over time.

In addition, the familiar look and feel of the Windows interface allows change to be introduced across the enterprise with less resistance. Bursa says they are seeing that the Windows NT platform is becoming the platform of choice. Realistically, companies will not switch to flow manufacturing in one swift move, but rather phase in this new business process, testing it in sectors that will still need to be integrated with the enterprise as a whole. For this reason, ERP solutions that support flow will emerge as significant leaders as this business practice continues to gain momentum.