
Information glut is
the hallmark of today's
business world, but
in most cases the right
information is exceedingly
difficult to find.

Realistically Mining the Data

By Dave Turbide, CFPIM, CMfgE, CIRM

Amid the masses of data stored and displayed by the typical enterprise system, it is often a tedious process to find the work orders that support a customer order, the impact of a late delivery or machine breakdown, or just which activity is most likely to cause late shipments and customer dissatisfaction.

This problem has existed since the dawn of manufacturing information systems and has only gotten worse as systems have become more comprehensive, more integrated, and more complex. The data is there. The system has done all the coordination and calculation necessary to help us identify and manage all these things together. It's just not easy to find specific information in a context that answers the basic questions we face every day: When will this customer order ship? What should I be working on next? What order/resource is most likely to cause a problem? How can I identify and prevent delays before they happen?

The batch dilemma

THE FIRST USE OF material requirements planning (MRP) was a real breakthrough. The basic idea, identify what you will need and when you will need it, is brilliant in its simplicity and utility. But MRP is run in a batch process, often at off hours, such as on weekends. It can take days to work through the plan and react to the system's recommendations. Meanwhile, things change and the data become less and less valid as the plan loses touch with the current situation.

In the early days of MRP, it was not uncommon for the planning run generation to take 20 hours or more to complete. Since most other activity must be suspended during the MRP calculations, the planning run was relegated to a once-per-week, weekend-only activity, at best. Nevertheless, we were glad to have it because it was a huge improvement over the manual, order point-oriented systems that preceded computerized planning.

It soon became clear that MRP generates a lot of data—and a lot of recommendations. Sorting through all of these could take days. Meanwhile, new orders came in, production disruptions changed actual lead times, and vendor receipts were late or incorrect.

As computers got faster, it became possible in many cases to execute the planning run overnight. Many companies saw this as a solution to the information overload problem. If the interval between runs is shorter, there should be fewer changes to deal with. This certainly helped, but the problem remained—it was just divided up into smaller bites.

Most planners fall into a pattern of reviewing and acting on MRP recommendations primarily according to the nature of the message. They handle the long expedite messages first, for example, then deal with the release recommendations, followed by short expedites, cancellations, and, if there's time, the defer messages. Still, the item-by-item orientation of the MRP process and its reports and recommendations make it difficult to know the impact of taking (or not taking) the recommended actions. It's easy to expedite parts to replenish shelf stock while other parts needed to ship a customer order this week may not get the priority they deserve.

Once again, it seemed that technology would help us resolve these difficulties. Advances in computer speed and capacity, coupled with the application of sophisticated calculation techniques borrowed from other disciplines, enabled us to rely on the computer to make more judgmental decisions for us. Advanced planning systems (APS) electronically apply optimization and other techniques to handle trade-offs between cost and benefits, and it's at this point that we should be asking questions. Questions like should we expedite this part to make the product ship date? Or, which job sequence gives the "best" return, according to a given set of criteria?

APS planning is also fast. It brought us the ability to generate a plan in seconds or minutes, and the resultant desire to do just that. With today's advanced planning engines, we can completely regenerate the plan whenever a new customer order comes in, a machine stops unexpectedly, a component doesn't arrive on schedule, or a manager decides to change priorities.

At-a-Glance

- As computer systems have become more comprehensive, integrated, and complex, finding the data needed to make the important decisions has become more and more difficult.
- Advanced planning systems (APS) have evolved into fast and sophisticated tools, but they also enable plans to be constantly regenerated, which introduces a new set of problems.
- Reality-based priority management (RPM) is an approach to information retrieval that focuses on the activities that are most likely to cause a delay.

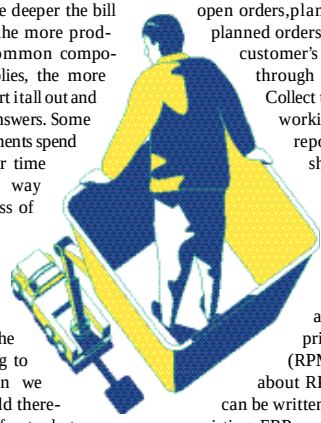
But the frequent replanning has caused a whole new set of problems. While things might look better in the front office—there's an optimized plan in place that's as fresh as the last inquiry—it's total chaos in the plant. The constant changes to plans and priorities whipsaw the production resources causing frequent setups, rework, inefficiency, and quality problems.

As a result,many users of fast schedulers and advanced planning systems are now restricting their use and only regenerating the plan once per day—back to the batch thinking that we were trying to move beyond. Planning isn't really the problem. We have a whole range of plan-ning solutions to fit every need and situation. The problem is on the execution side.

Revving up execution

CURRENT PLANNING LOGIC provides a comprehensive list of what must happen in order to complete customer orders on time, minimize inventory, and operate efficiently. In an ideal situation,things will happen just as they are planned—materials and components will arrive on time, there will be no unexpected scrap or unusable parts, production activities will proceed as expected, and customers will never change their orders after they're booked.

This whole concept of planning (and advanced planning), however, stops short of providing much help on the execution side. Whatever the planning method or frequency, the procurement and production departments are left with instructions on what to do to support the overall plan—but not much in the way of context. In other words, which specific actions will affect which specific customer shipments? Plans are developed item by item. Tracing the impact of an action or a change—such as a late receipt or quality problem—is problematic. Startingat either the top (customer order) or the bottom (raw material) or anywhere in between, tracing demand involves pegging through the bill of material one level at a time and matching required quantities and dates to find the next level (component or parent item). The deeper the bill of material and the more products that use common components or assemblies, the more diffi-cultitis to sort itall out and get the required answers. Some materials departments spend nearly all of their time slogging their way through this mass of detailed data.



The information we need is already in the system somewhere and the problem is trying to get it out when we need it. We should therefore be looking for tools to help access the information, rather than trying to change the information itself. An advantage of this approach is that it works equally well with traditional MRP as with the newer advanced planning systems.

A normal MRP report will show all items/orders to be released, expedited, deferred, or cancelled. The planning process has correctly identified all the actions needed to meet the requirements. All standard MRP reports and inquiries, however, are item oriented. This is so because the entire MRP process and logic are item oriented. There's nothing inherently wrong withthis, but itmakes retrieval of all theinformation relative to a customer order, for example,an arduous process.

Now, let's access this MRP information but bring it together according to the customer order. Include all inventory, open orders,planned orders, and firm planned orders that will support this customer's requirement, down through all levels of the bill. Collect this information into a working file and provide reports and inquiries that show all the recommended actions for any items or orders no matter where they happen to fall within the product structure. I call this approach reality-based priority management (RPM). The nice thing about RPM software is that it can be written totally outside of the existing ERP system and is therefore immune to system upgrades and version concerns unless there is a change in the database structure.

This is not hard pegging, in which order identification is imbedded within each demand, work order, and planned order. Hard pegging is highly restrictive—it prevents flexibility—and is only useful in specialized situations such as government contracting where the customer might actually own parts and work in process (WIP). Since RPM pegging is accomplished completely outside the ERP environment, the hard relationship links exist only for the benefit of the reports and screens used to execute the plan. When the plan is regenerated, the system has complete discretion to replan according to its own logic and the supply-demand equation. Another RPM extraction and calculation readies the work file for the next round of execution decisions.

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Anticipation

THE BASIS OF THE theory of constraints is to identify the constraining resource, or bottleneck, and build your plan and control around that bottleneck, maximizing overall throughput. The RPM information retrieval approach borrows from this idea by focusing on the activities that are most critical—the ones most likely to cause a delay. With its customer order orientation, it becomes easy to see which activities pose the highest risk to on-time completion of the customer order. Managers can use this information to pro-actively address these work orders, purchases, or resource issues. It also makes it easy to identify which activities directly support customer requirements and which are in the plan simply to replenish inventory or meet safety stock requirements. While replenishment is an important objective, it should always take a back seat to satisfying customer demands.

This new approach makes effective use of the data and information that already exist within the enterprise system. It doesn't change or affect the existing system in any way, and it's not a software modification that might affect support costs. It gives managers an execution tool to greatly improve on-time shipment performance and maximize the effective use of resources, applying them where they can do the most good. ◆

Dave Turbide, CFPIM, CMfgE, CIRM, is an independent market analyst and consultant with more than 25 years of experience helping companies select, implement, and benefit from information management systems. He is the author of six books including Why Systems Fail *(Industrial Press, 1996), and was founder and chief editor of* Midrange ERP *magazine. He can be reached via e-mail at dave@daveturbide.com.*