Best Practices for Optimizing the Production Scheduling Process

IQMS
Manufacturing ERP

Best Practices for Optimizing the Production Scheduling Process

Most parts makers and subcontract processors strive to work fast and efficiently. To achieve the desired productivity, they need more than process equipment that's durable, reliable and well maintained. They also must have optimal production processes in place.

Yet, throughout plants large and small, operations managers encounter obstacles. Scheduling production alone is a challenge as they consider the availability of their workforce, vendors, tools and supplies, along with their customers' deadlines. Add to this the struggles they face in using imperfect planning and scheduling processes and systems.

For example, manufacturers may be using inefficient, legacy enterprise resource planning (ERP) demand reporting, material requirements, or other enterprise planning software in their efforts to schedule production. Or perhaps they rely on one or more of the following antiquated systems to schedule production: Kanban paper cards, releases against blanket purchase order printouts, spreadsheet models, printed emails, email threads, white boards with handwritten notes, or even jots on scraps of paper. All of these records quickly become obsolete and restrict access to vital information as one-off copies.

Though members of the production scheduling team may be hardworking and experienced, they often do not have the tools and information necessary to optimize production schedules.

In their book, *Productivity Management: A Systems Approach*, Prem Vrat, G. D. Sardana, and B. S. Sahay observe that, "An ineffective production planning, scheduling and follow-up can fritter away the resources of manufacturing." And they go on to explain, "It can also be responsible for delays in schedules, machine idle time, queuing and congestion before machines."

Yet, innovative manufacturers have been able solve the puzzle through thoughtful application of smart technology. This paper examines the challenges of production scheduling and best practices for using technology to optimize production scheduling processes. Additionally, it reviews real-world examples of how three manufacturers are using monitoring software with their ERP systems to boost efficiency, cut costs, and improve customer service.

A Typical Production Scheduling Scene

Let's first look at a typical manufacturing company's production control or scheduling office in Anywhere U.S.A to see the tools generally available and how schedulers use them on a daily basis.

When we open the door, we usually see a number of paper folders, printed spreadsheets with handwritten notes jotted in the margins, and yellow sticky notes stuck on computer screens. The phones are ringing, and schedulers are repeatedly calling operations, purchasing, maintenance and the tool shop to ask about the status of equipment, materials, tools and jobs on the floor.

When asking the schedulers how they know what to plan for the next shifts, days and weeks, they often respond that they have an "updated" schedule report. Typically, this report has been generated by an older enterprise software system that runs as a nightly "batch job" based on sales orders, customer releases, and material on hand and on order. Sometimes this report is generated only once a week, usually on a Sunday evening.

"We were working for the system rather than the system working for us," recalls Mike Hopkins, production material control and MIS manager at Nissen Chemitec America. "Our old system was designed for suppliers of Detroit's big-three automakers, not the dozen more now assembling vehicles in North America, so it didn't meet many of our current needs. It was cumbersome, required heavy data entry and — though we were striving to be lean — it blocked our efforts because of all the things we had to do to maintain it."

In other cases, schedulers will note that they have a spreadsheet model with "secret sauce" formulas loaded up with data from the nightly/weekly schedule report that is then manually updated on the fly as the day unfolds based on emails; phone calls; and visits from floor supervisors, purchasing buyers, and warehouse managers. These requests, inputs and feedback cover topics ranging from actual stock levels, people out for the day, equipment, tooling, and urgent demand to unplanned emergencies.

"Our customers want quality parts, in the correct quantity, on time and at a competitive price," explains Hopkins. "In the automotive industry, electronic data interchange (EDI) is a major component in a supplier's ability to deliver what automakers want. With our old system, 80 percent of the time we couldn't respond fast enough to EDI errors because the data transfer was so slow. This problem was magnified with our biggest account because that customer's plant is only 40 minutes away, so shipping errors were arriving at the plant before we could catch them."

Regardless of the toolset, the "scheduling process" is usually hectic and loosely documented. It's very telling to ask plant operations managers what they'd do if their senior schedulers were suddenly absent for more than a week due to illness, vacation, a new job or retirement. Judging from the worried looks on their faces, it's clear that factory performance and customer deliveries are extremely dependent on a single person, or a couple of people at best. This is a risk that manufacturers can't afford to take.

A more effective approach is employing software designed for scheduling production in real time against finite (real) capacity constraints. This provides the ability to run what-if scenarios to fit shifting demands while taking into account tooling and downtime for scheduled maintenance. In addition to fitting demand into every bit of processing time available, manufacturers also gain solid insights into available capacity for additional business.
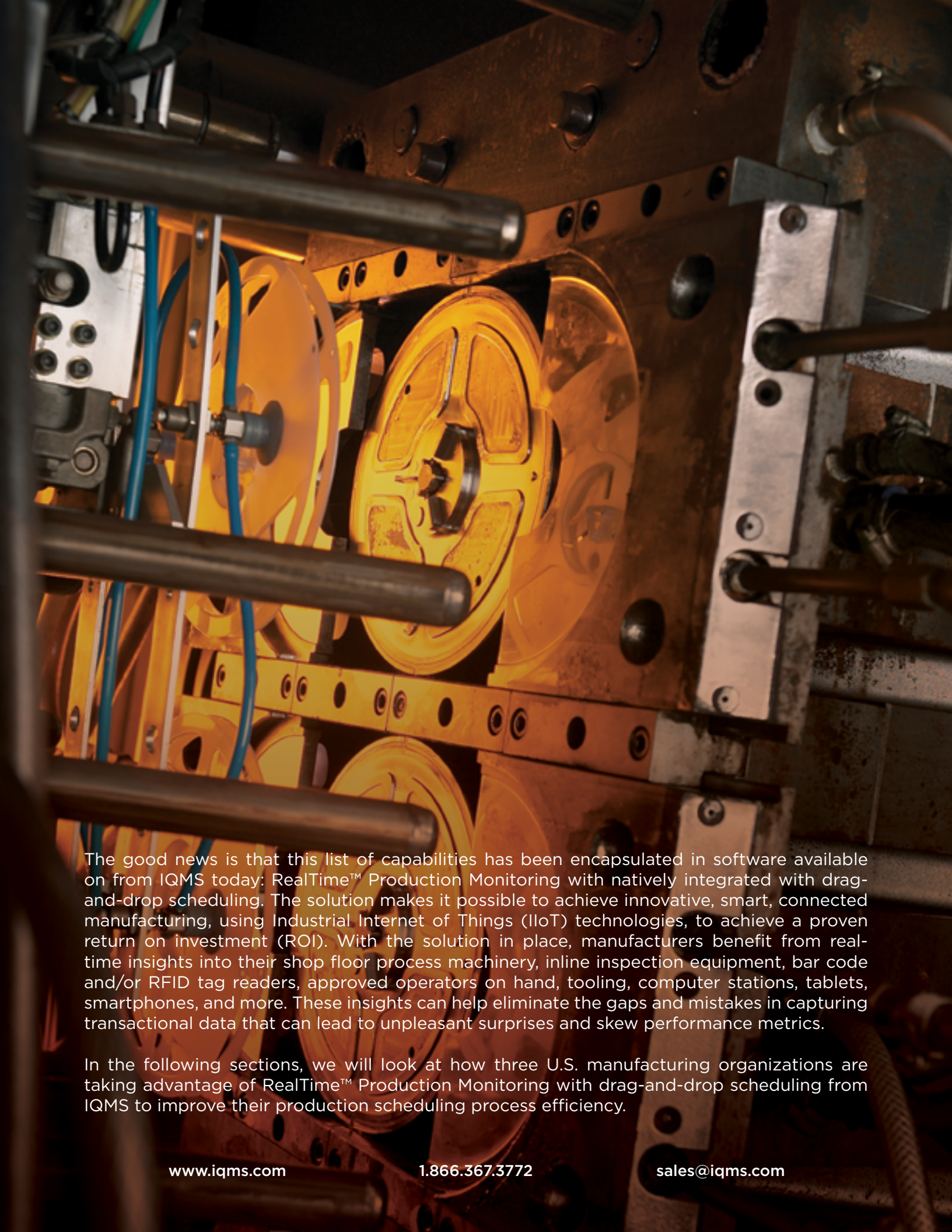
Production Scheduling Best Practices

In manufacturing, actually making something requires a number of elements to come together at the same time: forecasted demand, customer orders, backlogs, capable equipment, the right tooling, specified raw materials, containers/dunnage, work instructions, and trained operators. Similarly, schedulers must coordinate the critical resources at appointed times and occupy them for designated periods of time.

Most operations leaders will agree that it is fairly common to experience challenges in supply chain deliveries of inbound materials and components, shifting customer demand, including EDI order data, equipment uptime, tooling readiness, and approved operator availability. Even major OEMs and large tier-1 and tier-2 manufacturers with strong quality and production systems report struggling with these issues. So, to borrow a mantra from the United States Marine Corps, how can production teams "Improvise, Adapt, and Overcome?"

Seven Most Coveted Production Scheduling Tool Capabilities

Let's begin by asking two more questions: What would the ideal scheduling tool look like? And what attributes and features would make it usable, efficient and effective? The answer to both is a list of the scheduling capabilities most often coveted among manufacturing plant production teams and schedulers:

1. Ability to act in real time to provide actionable insights
2. A grid-like user interface that updates visually within seconds
3. Drag-and-drop screen interaction by schedules
4. Real-time updates of key inputs, such as stock levels of source materials, equipment tooling readiness and capacity, and availability of approved operators on production days
5. Use of algorithms that handle both infinite- and fixed-capacity methodologies by types of process to enable available-to-promise for production and capable-to-promise for quotations to customers
6. A single database with direct links to the current status of all critical inputs
7. Automated integration with shop floor process machinery, inline inspection equipment, bar code and/or RFID tag readers, computer stations, tablets and smartphones

The good news is that this list of capabilities has been encapsulated in software available on from IQMS today: RealTime™ Production Monitoring with natively integrated with drag-and-drop scheduling. The solution makes it possible to achieve innovative, smart, connected manufacturing, using Industrial Internet of Things (IIoT) technologies, to achieve a proven return on investment (ROI). With the solution in place, manufacturers benefit from real-time insights into their shop floor process machinery, inline inspection equipment, bar code and/or RFID tag readers, approved operators on hand, tooling, computer stations, tablets, smartphones, and more. These insights can help eliminate the gaps and mistakes in capturing transactional data that can lead to unpleasant surprises and skew performance metrics.

In the following sections, we will look at how three U.S. manufacturing organizations are taking advantage of RealTime™ Production Monitoring with drag-and-drop scheduling from IQMS to improve their production scheduling process efficiency.

**Nissen Chemitec America Gets Real-Time Power Over Processes**

Earlier we looked at some of the previous challenges faced by Nissen Chemitec America, which relies on electronic data interchange (EDI) data to set daily schedules, forecast demand, and communicate with customers and suppliers. Today, using the IQMS system, Nissen Chemitec America's EDI-pushed data is elevated to new levels of accuracy because the company also uses RealTime Production Monitoring. Part of the IQMS system, it provides an easy, cost-effective means for Nissen Chemitec America to automatically capture and use data from the shop floor as production occurs in real time.

RealTime Machine Monitoring connects each work center to the IQMS database and allows Nissen Chemitec America to follow jobs as they move from the schedule through production. Because production data feeds directly into the ERP database, job status is automatically updated down to the minute. The system also supports powerful, graphical scheduling screens and reports that can be used by anyone, from anywhere — within the company or remotely — to assess job status, track downtime, view quality data, and more.

"We added IQMS RealTime Production Monitoring so we could see what was happening on the shop floor without having to walk around," said Hopkins. "It allows us to step up our processes where we might be having a problem. And because it is Integrated with shop data, our operators can see what a machine is doing, so they can proactively catch issues before they get out of hand."

Prior to implementing the IQMS system, Nissen Chemitec America used an infinite-capacity schedule that was based only on demand. Now, its RealTime Production Monitoring system uses a graphical, finite schedule to assess not only machine capacity, but also labor capacity. Taking the system a step further, Nissen Chemitec America also uses a comprehensive quality management suite of products to control pre-production items, along with statistical process control (SPC) functionality. By monitoring all aspects within a single IQMS system, data is communicated more quickly, without error, and it is available for review at any time.

"Before we were operating with only half the picture," said Hopkins. "Now we have control over every part of the equation, from purchasing and scheduling to on-time delivery for every part we make. IQMS gives us real power over our processes because it's user-friendly, comprehensive, and it allows everyone in the company access to the same timely data."
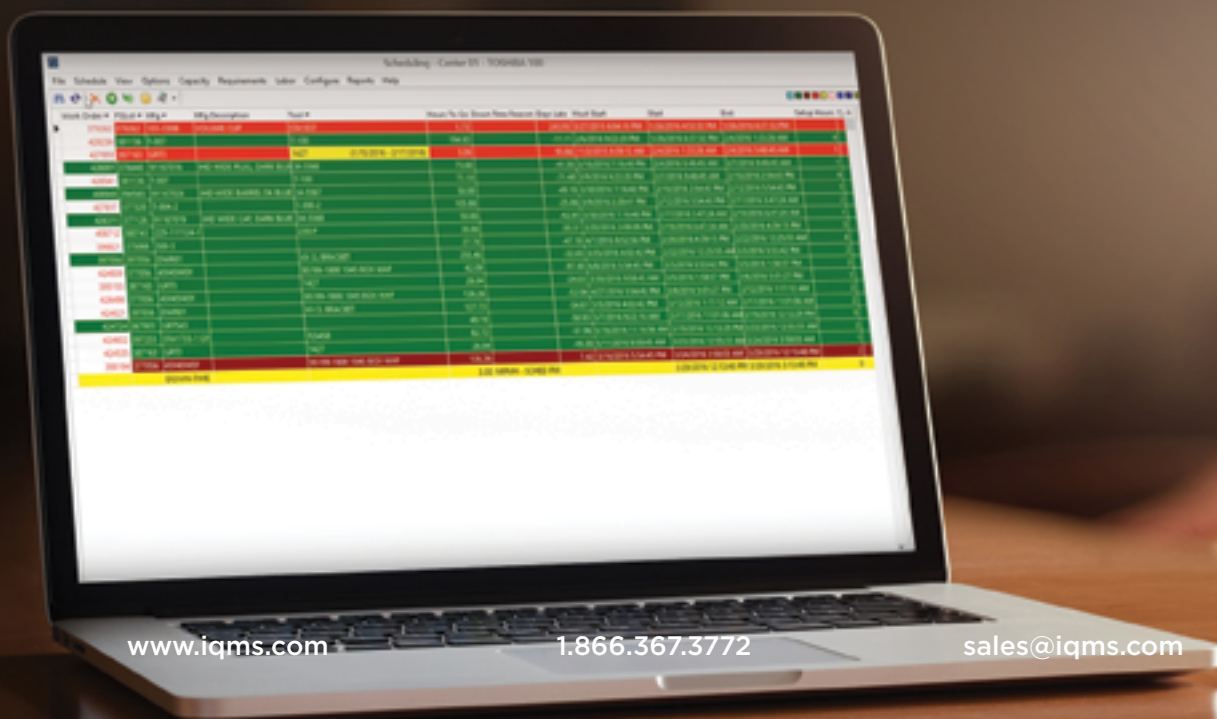
## Tessy Plastics and Mar-Bal, Inc. Boost Efficiency and Savings

Two other manufacturers realizing benefits from IQMS RealTime Production Monitoring are Tessy Plastics and Mar-Bal, Inc.

At Tessy Plastics, having accurate production information available to all employees and managers is recognized as being critical for improving operational efficiencies.

"We have information centers throughout the plant so everyone can see how we're performing," explains Doug Jobe, director of operations at Tessy Plastics. "We look at automation as one huge group. That includes not only molding machines that are capable, but also the robots — and software — that are capable. What we've been able to do with IQMS is combine all those things into systems that work."

Meanwhile, Mar-Bal, Inc. has experienced both immediate and long-term savings with IQMS' manufacturing ERP solution. Annually, the total savings are approximately $270,000 across its four plants as well as nearly 4,400 potential machine hours that are no longer lost to downtime for monthly physical inventory checks.

The key to Mar-Bal finding considerable savings was the addition of IQMS RealTime Production Monitoring to its ERP system to track all aspects of part production as they occur. RealTime Production Monitoring optimizes manufacturing performance by enabling Mar-Bal to monitor work center performance as it happens and proactively address potential problems. Graphically, Mar-Bal can now see all of its presses during a shift, how jobs are running, how much scrap is being generated, if cycle time is slow, and whether or not there are problems that require attention.
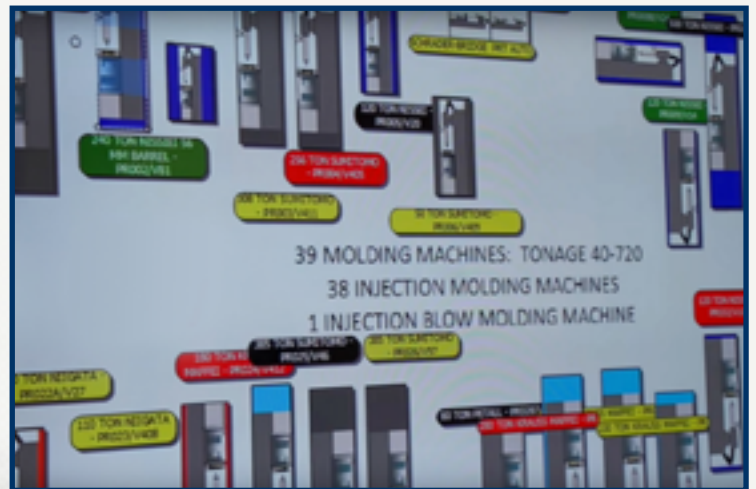
Utilizing a large touch screen, this is one of many information centers utilized by Tessy Plastics to help keep everyone on the same page with regard to production status.
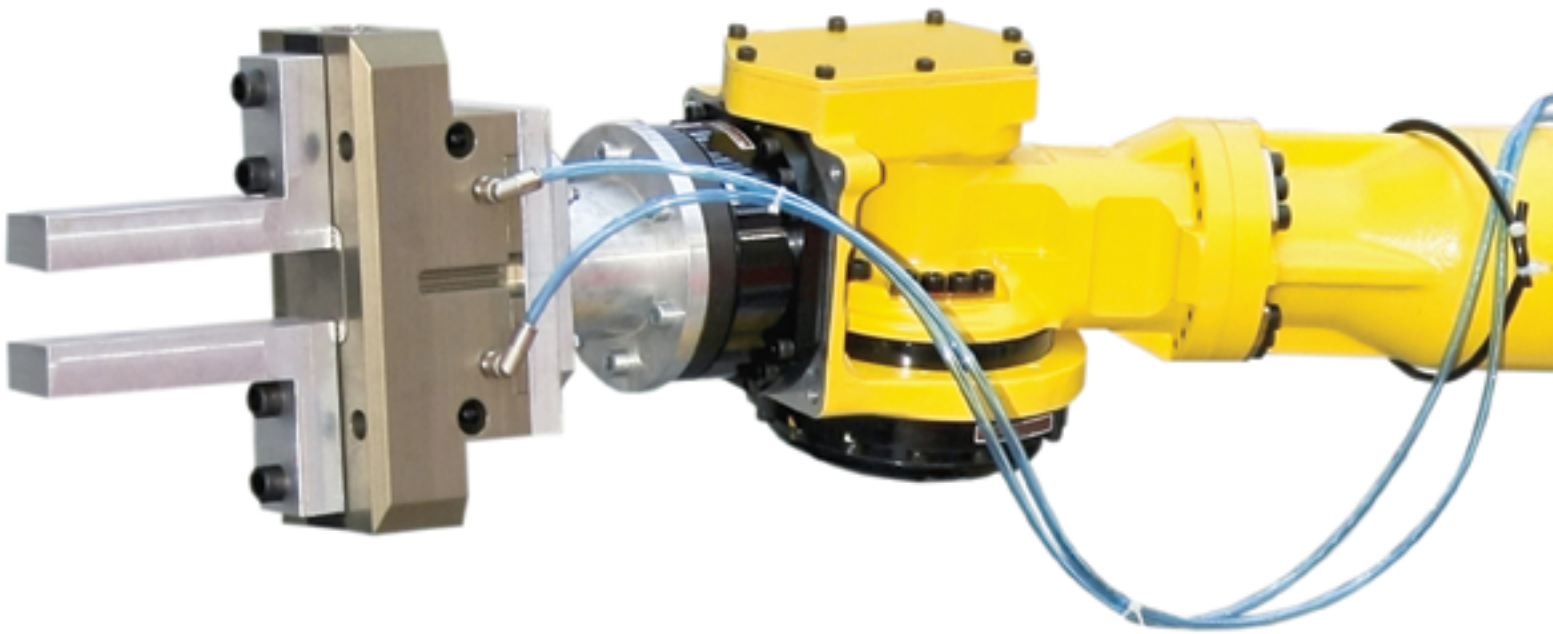
Drive Operational Efficiency and Customer Satisfaction

IQMS RealTime Production Monitoring, natively integrated with drag-and-drop scheduling functionality, gives manufacturers an edge over the competition. The system reduces reliance on one or two individuals to perfectly remember many details and orchestrate responses to constantly changing inputs. When scheduling criteria change, re-provisioning of resources ripples across the enterprise.

Also unique to drag-and-drop scheduling functionality from IQMS are its speed and ease of use. When a change is made by dragging and dropping one or more new elements into the mix, the system instantly and automatically re-provisions resources to the best fit. The speed with which it manages this complexity is lightning fast — a real advantage to production leaders.

The system can calculate updates to tens of thousands of orders in a matter of seconds to minutes. This immediate, real-time update of information through the entire IQMS system allows employees to quickly respond to customers when delivery dates or quantities need to be changed or items can ship sooner than expected.

RealTime Production Monitoring with drag-and-drop scheduling from IQMS can quickly lead to improved productivity, manager confidence, reduced costs, and higher value to ownership for manufacturers worldwide.

About IQMS

Since 1989, IQMS has been designing and developing ERP software for the repetitive, process and discrete manufacturing industries. Today, IQMS provides a comprehensive real-time Manufacturing Execution System (MES) and ERP software solution to automotive, medical, packaging, consumer goods and other manufacturing markets. The innovative, single database enterprise software solution, EnterpriseIQ, offers a scalable system designed to adeptly grow with the client and complete business functionality, including accounting, quality control, supply chain, CRM and eBusiness. With offices across North America, Europe and Asia, IQMS serves manufacturers around the world.

To learn more about IQMS' comprehensive ERP and MES solution, please visit www.iqms.com.

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