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Intelligent metrics ensure success

GED learns to track and take action based on performance metrics

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Choosing and tracking business performance metrics is an accepted best practice in manufacturing operations. But choosing the correct metrics and establishing automated systems for collecting the data from throughout the operation are challenging tasks that require careful consideration, particularly in complex manufacturing environments. GED Integrated Solutions went through the process of identifying and implementing metrics to drive its business process improvement program in 2002 and has since learned many important lessons in how to track and leverage business metrics to improve operational performance.

GED manufactures equipment for the window and door industry, running processes ranging from make-to-stock items to engineer-to-order and configure-to-order. Moreover, GED operates two very different facilities in two different states. These dynamics presented a number of challenges to GED in implementing IFS Applications™ and in choosing and acting on appropriate metrics throughout the organization. The company's Twinsburg, Ohio, plant produces capital equipment for companies in the insulated glass sector of the window and door industry. This equipment is characterized by standard specifications and limited flexibility in options and features.

In the meantime, GED's Hauppauge, N.Y., plant manufactures equipment for the vinyl window industry.

"The New York plant is make-to-order and engineer-to-order," Business Integration Manager Tony Chalet said. "At least 40 percent of the business there is made to order. This is because the fixturing on the equipment is very dependent on the type and size of extruded profiles that the window manufacturers use for their sash. These vinyl extrusions are used primarily for windows and doors. This means that we need to offer a base machine with fixtures specific to the sash size and profile."

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Apart from accommodating GED's mixed-mode business model, the company faces other complexities that led to its implementation of IFS Applications in early 2002. According to Chalet, the different operations at the Twinsburg and Hauppauge plants placed very different demands on their ERP system.

"The problem in New York was supply chain visibility," Chalet said. "Procurement was based on the supervisors on the floor turning in requisitions and creating purchase orders. There was no manufacturing resources planning (MRP) system. Labor hours and labor costs were also very difficult to track. We were using a manual time card system until we brought in IFS/Time Clock, which automated that reporting."

In Twinsburg, GED had long been running on a legacy ERP system, so the transition to IFS Applications was not as dramatic as in Hauppauge.

"With IFS, we did implement cycle counting and consignment inventory programs," Chalet said. "We automated our engineering release process through IFS Document Management™, and that allowed for collaboration in a potential series of operations to be done in sequence. With IFS Applications, our return material authorization (RMA) procedure was also improved. Some customers may have gotten a part from us that is under warranty, and our RMA procedures track these part disbursements."

During and since its IFS implementation, GED staff has worked continuously to determine appropriate metrics that its enterprise application could help them measure and to act on those metrics to improve profitability. Metrics were driven, in turn, by GED's customer-centric, lean corporate philosophy.

"We have a customer focus that drives our entire business," Chalet said. "We have a corporate policy statement that stresses speed, accuracy and response, and our quality policy is prevention, empowerment, customer focus, and Kaizen. These are our mission objectives. Everything you do, including metrics, revolves around those things. We looked at customer focus as being primary."

Once big-picture corporate policy is identified, metrics need to be identified that serve that corporate mission. It is these details that give substance to the generalities of a corporate mission statement, and metrics must be selected with care to support management's goals.

"We got to be very knowledgeable in understanding what we needed to measure," Chalet said. "That is the first key thing with metrics. If you are not measuring something that impacts the business, you are wasting your time. So we figured out key factors that impact the business. The next thing we did was, within those metrics, to establish benchmarks. Once you have figured out where you are, you can set the improvement objectives."

Conflicting metrics

According to Chalet, GED faced the conundrum faced by many companies when they are identifying suitable performance metrics. In many cases, one metric increases only at the expense of another one. For example, GED wanted to track the speed with which service part orders are being delivered, but this metric tended to conflict with metrics designed to track the amount of inventory on hand.

Another conflict GED had to confront was the dynamic between replacement parts fulfillment and shop orders for new equipment. Parts earmarked for a piece of new machinery being assembled on the shop floor might be redirected to replacement fulfillment, resulting in delays in new machinery delivery.

“In designing our metrics, we wanted to drive change and improvement cross-functionally,” Chalet said. “We didn’t want to improve one area that will hurt another. One area where this became a struggle was in the question of how much inventory to hold versus the availability of service parts. We had an inventory turns goal, specifically to improve from 4.47, where we were at the beginning, to our target of 7.5. We are currently at 7.43 and think that is a pretty good improvement from our pre-IFS performance.”

According to Chalet, GED had to resort to innovative management techniques to address the inventory-response conundrum. To reduce inventory, GED began to work closely with its top suppliers to create off-site consignment inventory programs that provide ready availability of inventory without ownership until the parts have been consumed.

“If you hold fewer parts in inventory, it gets harder to ship parts,” Chalet said. “Reconciling our goals for inventory turns with those for parts order delivery forced us to take a look together with both objectives, and we wound up with a consignment inventory program with our suppliers. Many parts targeted for aftermarket replacement are now kept off-site and purchased as they are consumed. We have implemented this with 12 of our top suppliers. We are doing this, for instance, with Allen Bradley parts from Rexel USA, power and transmission components from PTE Drives, and bearings and pneumatics from Bearing and Transmission Supply. We are also doing this with linear motion components from THK and pneumatic assemblies from Festo.”

To expedite replacement parts delivery to customers, GED took its vendor-managed inventory to another level, according to Chalet.

“While vendor-managed inventory helped us increase our inventory turns, our suppliers have also agreed to drop ship aftermarket parts directly to GED customers,” Chalet said. “These shipments still appear to come directly from GED. I would say this is somewhat unique. Typically, one area or the other—inventory turns or parts

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shipment turnaround—suffers. There is a trade-off between service level and inventory turnover. The higher inventory you hold, the better service level, but at the expense of lower inventory turns.”

The conflict between replacement parts order turnaround and new machinery timelines necessitated a systematic change in GED’s processes. This was addressed by the implementation of best management practices inherent in the company’s new ERP environment.

“Prior to IFS, we had a soft allocation system,” Chalet said. “With IFS, we have a hard reservation system. After we made this change, we immediately struggled with service parts reservation and often shipped a part for a customer order that was needed in production a week later. Now, availability checks are made to ensure that the part is not taken, causing a shortage on the floor. This inspired another dynamic of shortage tracking. We had to find out the source of shortages—whether we were not lot sizing correctly or had inaccurate lead times, or whether there were other underlying causes. In the end, reservation processing became manageable.”

Reconciling inventory reserved for the shop floor versus replacement order fulfillment by relying on IFS’ hard allocation process took about four months, and according to Chalet, left GED with one more significant hurdle to overcome before inventory processes were truly under control.

“It took us some pain and anguish to really understand how return merchandise authorizations (RMAs) needed to work,” Chalet said, explaining that component parts that were returned by GED customers were being re-entered into inventory without considering their condition and without confirming them as valid returns. “We did not understand fully that the receipt of an RMA was a two-step process.”

The first step in the process was actually receiving the part as a returned item and acknowledging its arrival.

“Initially, when we received a part on an RMA and then immediately processed the receipt into inventory, it hit the general ledger inventory,” Chalet said. “If it was bad, it was scrapped later, and we took a hit to the general ledger. But we realized that we needed to scrap the part directly out of the RMA rather than entering it back into inventory before processing a receipt to inventory, thus avoiding the scrap loss.”

Once the part was received, a second step in the process was to certify that the RMA was a valid return. This step was driven by GED’s metric on cost of quality.

“We realized at this point that it did not make sense to award customer credit for a return unless it was a good return,” Chalet said. “We needed to make sure the item was under warranty or under our supplier’s warranty, and that a credit truly was due. We started requiring customers to send the serial number of the machine

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it came off of, and that improved our RMA flow quite a bit. We don't track serial numbers to a component level, but we know when a particular machine was built and whether a part on that machine was still under warranty."

Resolving the various conflicting metrics between inventory turn, customer parts order turnaround, and new equipment promise date has left GED in an admirable position with regard to customer service and operational efficiency.

"One key metric for us is on-time shipments from parts orders," Chalet said. "Our goal for service parts order delivery was to have 80 percent of parts leave within 24 hours of a customer order. In 2004, we were at 79 percent, but now we are at 85 percent and have seen that metric as high as 89 percent. Service parts are a substantial part of our business, so this is very important to us and to our customers. On the new machinery side, the goal is 80 percent delivered to promise date, but our combined metric from our New York and Ohio operations is now 89.4 percent."

Macro versus micro metrics

To turn individual metrics into meaningful data to drive management of its operations, GED consolidates these figures for the company as a whole and breaks them out by location. The ability to compare performance of its New York and Ohio facilities has been particularly useful in helping GED meet its business process management goals.

"When we brought our New York facility online with IFS, we measured our supply base on deliveries to us in two ways," Chalet said. "We looked at how well each supplier meets its committed promise dates, delivery reliability versus delivery responsiveness, or how far they go out of their way to provide the part more quickly than promised if our wanted date violates their established lead times. We extract information from IFS, put it into a pivot table, and compare individual supplier performance against the average for all suppliers. We use Pareto analysis extensively to identify suppliers in need of improvement. Measurement is one thing, but if you don't act on it to improve the business, you are just spinning your wheels."

Originally, GED suppliers exhibited a wide range of responsiveness—and ranked lower in responsiveness in New York versus Ohio. To address this, GED implemented the same planning tools used for the Ohio supply base, which included advanced forecast and planned order requirements reports, for the New York suppliers. However, this did not immediately improve the situation in New York because of poor communication on GED's part, which the company quickly rectified.

The 20 to 30 individual performance metrics that GED tracks contribute to a larger macro view of eight key areas of the organization. The company's gain sharing

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program is tied directly to how well GED performs in the areas of supplier score card, new product development, an HR metric of 12-month consolidated turnover, service parts order delivery, consolidated emergency response time for critical “customer down” cases, machinery on-time shipment, machinery on-time installation, and cycle count accuracy.

Continuing changes, improvement

“Our next goal is to eliminate year-end physical inventory—probably in 2007—as we have a proven track record of improved and sustained accuracy over the past several years from our daily cycle counting program,” Chalet said. “We should be able to convince our auditors that it is no longer necessary. After all, conducting a physical inventory is nonproductive and takes us two to three days to perform at the expense of lost production time.”

From time to time, Chalet stresses that new metrics might become desirable while others might outlive their usefulness. As a result, simple methods need to be established to define a new metric at a comprehensive level so that the appropriate information can be accessed from within the ERP system.

“When we first planned out our metrics program, we had to be very familiar with the source data,” Chalet said. “Determining exactly what figures need to be tracked and where the data comes from are key. We have a good IT staff that can extract the data into easy-to-use formats once they know the source and ultimate objectives the metric is intended to measure. Once the data is available, application of parameters and filters is simple. The tool used is SQL plus, and it is just used to extract data from our Oracle tables. The presentation tool is generally just Excel®.”

According to Chalet, the query process is necessary only for new metrics. Once they are set up, metrics data can be accessed freely by the appropriate members of the management team. The importance of each metric will change over time, and information can be reviewed frequently or infrequently depending on how much management is struggling with a particular area of the business.

“Right now we are monitoring inventory movement on a weekly basis,” Chalet said. “We are interested in the relationship between purchase receipts coming in against demand from the shop floor and customer orders. If we are managing our inventory and procurement efforts effectively, we will see a strong correlation among these factors. Monitoring this relationship between supply and demand helps us to measure our effectiveness in keeping our inventory investment in check and at levels appropriate for sustaining our manufacturing activities and shipment. For this one, we developed an IFS quick report that can be easily exported into Excel.”

Metrics Mastery

Tony Chalet of GED Integrated Systems offers the following tips for anyone initiating or interested in improving their business performance metrics program.

Pick the measures that impact or effect change in the business. Some metrics are relevant to departments but not the organization as a whole, and often these departmental metrics conflict with each other. Inventory turns versus inventory on hand is one example of this. Another example is measuring material price variance versus total cost of inventory investment. Typically, larger volume purchases result in lower purchase order costs and favorable material price variances, but may be offset by higher inventory carrying charges.

A metric's usefulness comes in driving improvement. If a metric is not driving change, it is not of value. So metrics data must be actionable and subsequently acted upon.

The importance of tracking some metrics will change over time. We were tracking shop order shortages by planner because of problems with lot sizes or suppliers. Shortages were impacting shop schedule. As we improved, the problem severity and frequency was reduced—and since then we have just been spot checking.

Some metrics' importance rise and fall with cyclical business patterns. When things are booming, you are less concerned that you have dollars locked up in specific types of inventory. But as business slows and inventory accumulates, you can evaluate where orders need to be cut back. Any time inventory spikes, you can drill deeper into the data to address the backup.

Establish your benchmarks and reasonable goals. Take an incremental approach to goal setting. Constant feedback on how well you are doing against that plan will help you reach your goal over time. As you exceed that objective, goals can be made more aggressive in subsequent years.

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