

ADVANCED PLANNING AND SCHEDULING TECHNOLOGY PAPER



Advanced Finite Capacity Planning and Scheduling Helps McGard Lock Out The Competition

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Introduction

McGard Inc. of Orchard Park, New York introduced a unique one-piece wheel lock to prevent automotive wheel and tire theft 25 years ago. Over the past quarter century, McGard has built a leading market position not only in automotive wheel locks, but in security fastening products used in a wide range of applications.

The company's success is due to more than just innovative design. We at McGard continually strive to improve our company and ourselves and believe that providing consistently high quality and value to our customers is the very foundation of our business.

Key components of high quality and value are superior customer service and delivery. The ability to provide customers security products when they want them, even if they want them now, has provided McGard with an edge over its competition and has allowed our company to maintain its leading market position.

As part of ongoing improvement programs, McGard chose and implemented advanced finite capacity planning and scheduling (APS) software. We chose TACTIC, developed, marketed and supported by Waterloo Manufacturing Software of Wellesley, MA. Use of TACTIC has helped us significantly improve delivery, cut lead-times and reduce costs. We feel TACTIC will continue to help expand our profitability in an increasingly competitive marketplace.

Why Finite Capacity Scheduling?

We became interested in APS for a number of reasons.

1. First, given our emphasis on continuous improvement, we are always looking for ways to schedule better.
2. Second, effective scheduling, and the short lead times and on time delivery it produces, has become more critical. As manufacturing has grown more competitive, excellent customer service is more and more important to overall business success.
3. Third, scheduling has become more complex and harder to do because of the success of McGard's Special Products and the introduction of many new part numbers.

McGard's dedicated engineering staff and continuous R&D program has led to the development of security fasteners, called Special Products, for a wide range of applications.

Some of our special products include marine outboard motor and propeller locks, manhole cover locks, fire hydrant locks, gas meter locks, various locks for the oil well and fuel industries, and security fasteners for government and military installations. The wide range of applications has led to a development of over 8,000 different part numbers.

In looking for ways to improve our scheduling, we began by analyzing our current systems and procedures. McGard has a Production Control system that we developed in house and which runs on our IBM System 36. This system contains numerous modules: forecasting, bill-of-material, bill-of-material explosion, process routings, shop floor control, and rough cut capacity management. The software is very effective and is well suited to our business.

However, our Production Control system does not perform finite scheduling. Our system's capacity planning module was not detailed enough to help us make initial delivery promises, or to resolve subsequent scheduling problems. We felt we needed additional assistance to further improve our scheduling.

Over the years, we had augmented our Production Control system by performing finite scheduling manually. Our plant, like every other facility in existence, has a limited capacity. Finite scheduling allowed us to balance customer demands with our ability to respond. However, manually finite scheduling our plant was an extremely time consuming task. It took us hours to develop a schedule for even a small portion of our plant. Given the time involved, we were lucky if we could try even one scheduling alternative. Worse yet, the minute something changed, our schedule was invalid. At McGard, as in most manufacturing plants, machine, labor, tooling and material availability, and especially customer orders and priorities, often change. These changes resulted in a lot of manual scheduling effort going down the drain.

Given our Production Control system's inability to operate at a sufficient level of detail and our promising but limited success with manual finite scheduling, a software solution which would allow us to automate our manual calculations seemed to be the best way to meet our scheduling goals. Purchasing commercially available software rather than "reinventing the wheel" in house also seemed like the right thing to do. Therefore, we obtained a commitment from top management, developed some basic requirements and began talking with software vendors.

Why TACTIC?

Prior to evaluating software packages, we developed two fundamental criteria that had to be met.

1. First, the software would have to easily adapt to our existing software and manual systems.
2. Second, the software needed to be able to accurately reflect the reality of our shop floor.

McGard has spent significant amounts of time and effort developing our existing systems, which does much to meet our current needs. We were looking for software that would allow us to continuously improve on this investment and not force us to start over with all new software modules. Therefore, any software that we purchased had to integrate easily into our existing systems.

McGard also has somewhat of a unique production environment. Some areas of our plant resemble job shops, yet in others we produce in a high volume repetitive mode. Much of our product is made to customer order, yet other products are made to stock. We have a wide range of metalworking, heat-treating, plating and assembly processes. Any software that we purchased had to be flexible enough to handle this variability in production processes and methods and yet allow us to meet our overriding goal of customer service and satisfaction.

We looked at commercially available software for over a year. We contacted numerous vendors and had multiple on site demonstrations. We selected TACTIC from Waterloo Manufacturing Software because we felt it best met our two fundamental criteria. TACTIC possessed a generic data transfer format that allowed it to be easily linked with our existing systems. It was also flexible enough to map on well to the way we produce our products.

Implementation

After purchasing TACTIC, we received a week of training from Waterloo Manufacturing Software, picked an initial area of our plant for implementation, put together a project team and went to work. It took approximately 8 weeks of part time effort to get TACTIC up and running in this area. Since that time, we have gradually spread the use of TACTIC throughout our facility.

The training we received helped us not only understand the function and features of TACTIC, but gave us the knowledge necessary to put together and execute a smooth implementation. After the training, we decided to implement TACTIC in what we call our blanking area. In this area, parts go through a number of operations such as turning, thread rolling, tapping and drilling. We picked the blanking area because it a reasonably self-contained area of our plant. More importantly, however, it is our most troublesome scheduling area. Therefore, we stood to benefit the most from TACTIC.

After deciding to start in the blanking area, we put together a project team. The project team consisted of Peter McCauley who had overall management responsibility for blanking, Craig Alf, our MIS manager, and myself. We all committed to getting TACTIC up and running in the shortest time possible while still performing our regular duties. We broke the remainder of our implementation into the following steps: review and modification of available data, running the system with sample data, electronic data transfer, and manual input of data.

The largest task facing us was reviewing our existing data, primarily our routing, setup and process time data. While our data was sufficient for running our existing Production Control system, which operates at a fairly high level, we needed more detailed data for finite capacity scheduling. For instance, our Production Control system routes parts to departments, but to get the full benefit of APS, we knew we needed to schedule on a machine-by-machine basis. During this process, we also discovered that many of our standards were out of date.

We took the same continuous improvement approach to improving our data accuracy as McGard takes with other aspects of its business. We spent approximately 4 weeks making sure that our routings specified the right machines and instituting procedures to capture and feed back to TACTIC historical process time data. In this way, we were able to get TACTIC up and running very quickly. Initially, even with process times that were off, TACTIC greatly improved our scheduling. As time has passed, we have gradually improved our data so that TACTIC helps us predict with a high degree of accuracy when production will be completed.

Somewhat in parallel with our data accuracy task and extending about a week beyond it, we began to type sample data into TACTIC and experiment with scheduling. This step helped us better structure our data and helped us realize which data should be transferred to TACTIC electronically and which should be typed in manually. We next generated sample reports that we reviewed with the departments who would be using this output. This process provided feedback on how we could modify TACTIC to best meet company needs. It also started training department personnel on how they would interact with TACTIC and how TACTIC would influence their jobs.

Immediately after our experiments with scheduling, we were ready to transfer data from our System 36 via IBM PC Support to the personal computer on which we were running TACTIC. Initially, this data consisted primarily of process and routing information. It took some programming in order to get data from our mainframe into the proper format to be accepted by TACTIC. However, the task was quickly accomplished and within a few days, all the data that we initially required had been transferred from our mainframe into TACTIC.

After electronically transferring data to TACTIC, we manually structured and input other data, primarily on production orders. While we could have automated the transfer of this data from our mainframe, given our order volumes, it made the most sense to delay electronically transferring this information. We had a procedure in place for entering this data within a couple of days.

Once our production order data had been input, we were ready to begin scheduling. While we ran our other scheduling methods in parallel, we soon came to rely exclusively on TACTIC. Our implementation had taken us less than 8 weeks, and during this period we continued to perform our regular duties.

Benefits

We began to receive benefits from TACTIC immediately after we began using it. Initially, TACTIC showed us that the majority of orders in our blanking area were late. This came as no big surprise. For years, we required extensive use of overtime in the blanking area to maintain high levels of customer delivery. However, TACTIC allowed us to conclusively show why we were working overtime. It proved that more than just working extra hours was required to solve the problem. In fact, TACTIC helped us justify the purchase of well over \$100,000 worth of capital equipment to help deal with the heavy workload.

The next benefit we received from TACTIC was increased visibility. Prior to TACTIC, we were lucky if we could schedule a couple of days out; now we are able to look out a couple of weeks. The ability to see into the future allowed us to plan and schedule ahead as never before.

One example of the better planning and scheduling that we have achieved through TACTIC is in the area of set ups. In the past, we would often have orders on multiple pieces of equipment finishing at once. This would lead to operators and equipment sitting idle waiting for setup. Also, we were often forced to tear down setups prematurely. With TACTIC, we are able to stagger our setups to keep our equipment running. We are also able to plan ahead so as not to setup prematurely. With TACTIC, for the first time we have also been able to smoothly schedule down time due to preventative maintenance. Use of TACTIC to better schedule machine downtime and setups has allowed us to greatly improve our productivity and machine utilization and to better manage overtime.

Increased visibility has also helped us better keep promises to our customers. We now know when a customer order will finish up. When we accept new work into our factory, we can see the impact of that work on existing in process orders. Given the improved efficiency of the shop and the better capability given to us by TACTIC to manage work in process orders in our blanking area, we have been able to reduce lead times by almost 50%. We expect this lead-time reduction to approach 70% as we use TACTIC more.

TACTIC has also helped us improve teamwork and has brought about smoother working relationships between production, NC programming and production control. TACTIC provides us a forum for trying out our various what-if ideas. People are now able to come to me and say for instance "It will make my job a lot easier and will benefit the company if we run this order next". TACTIC gives us the ability to try those kinds of ideas out on the computer. Once we see the result of the ideas in TACTIC's graphical output, it becomes obvious to all of us whether or not it is a good idea.

We also expect TACTIC to help us do a better job managing and getting full value for our capital purchases. As noted, early in our use, TACTIC helped us justify the purchase of well over \$100,000 of capital equipment. Conversely, by helping us maintain delivery and get the most out of our existing equipment, it should help us avoid unnecessary capital purchases.

Summary

We at McGard are extremely happy with our investment in APS. We spent a year carefully choosing an APS system (TACTIC) that was flexible enough to fit our organization. We were able to implement TACTIC in the most troublesome area of our plant within 8 weeks. We began receiving significant benefits in terms of decrease lead-time, better customer service and reduced overtime almost immediately. We are experiencing similar benefits as we extend the use of TACTIC to the rest of our facility.

About the Author

Mr. Donald Zgoda is the operations manager for McGard, Inc. He has over 15 years experience in a variety of positions with McGard. Mr. Zgoda is an active member of the American Production and Inventory Control Society.

More Information

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