



Scheduling System for Production or Service

By Philip P. Beyer

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I've had many conversations with owners, production managers and plant managers all over the country, about Production and Service Scheduling Systems. I've been asked many times, "How can you deliver product on time, every time, at your company?" They expressed their doubts that it could be accomplished at their company, due to the difference between their turnaround times and ours, and the different types of products we manufacture.

After many calls and conversations, trying to encourage these owners and managers that it was possible to have on-time delivery, every time—I decided to write my thoughts down.

To start, I would like to remind you again, as with any process or event that needs to happen in a consistent manner, and on a given date, you must have a complete system—no gaps.

Today there are many types of Production and Service Scheduling Software on the market. Some companies use Excel Spreadsheets, Industry Specific Software, or a Manual Scheduling Board, showing all the jobs in progress for a given day. This can also be known as WIP (Work in Progress). As the job progresses through the production cycle toward the due date, the job moves from one process/work center to the next. A process/work center is the location where the work/process is performed. A process center may involve several processes, like a group of similar machines. Process/Work centers may be used to define costs, and therefore can be known as cost centers. Process/Work centers can also be grouped into higher-level departments (e.g. Pressroom Department).

Example: Printing Industry

(In printing, a job goes from data entry, to proofing, to plating, to the press, etc.)

Process/Work Center (Prepress-Plating) on Monday

Process/Work Center (Pressroom) on Tuesday

Process/Work Center (Paper Cutting Machine) on Wednesday

Process/Work Center (Folding, Stitching, etc.) on Thursday

Process/Work Center (Shipping or Delivery) on Friday

A large enough company may have one or even more employees whose sole job is manning the Scheduling System.

Too Many Hands in the Pot

The Scheduler normally receives his orders from the Production Manager who is generally running around the shop or plant putting out fires, trying to keep the wheels of production moving by directing and pushing jobs from one process/work center to the next.

Sales people are screaming at the Production Manager that their jobs are late or they need to put through a "rush job" for their top customer. With some sales people, every job is a rush job. They assume most of the jobs in production are already late, and figure they need to pad or fib about the due date, to ensure it gets to their customer on time. This creates more pressure, chaos and lost production time.

The boss also gets in on the act, barking orders to the Scheduler and Production Manager, as he may have his own clients—and everyone knows his jobs go through production, no matter what. The boss may also have a salesperson he is afraid of losing, breathing down his neck, reminding the boss that he is the "top sales person" and his jobs are "priority one."

Other Schedule Busters

To add more pressure and chaos to the Production Schedule, an upset customer may call to report an error on his job, and demand that it be redone RIGHT NOW. Now it's panic time. The whole production process is moved around, to make room, in order to redo this irate customer's

job at breakneck speed. You know the old saying, "There always seems to be enough time to redo a job, but never enough time to do it right the first time."

Worse case scenario, the unexpected seems to happen just when the production pressure is at its peak. A production worker runs up to the front office saying one of the main machines (Work Center) is down. Now the whole production process goes into a tail spin. A lot of breakdowns in equipment are due to the fact that there's not a well-planned Preventative Maintenance System in place.

In some companies, schedules are delayed or moved for the simple reason that certain employees refuse to work overtime. The company has no written policy about working overtime; a policy that should be given to the employee when they are first hired, as part of their orientation. At our company, the new employee signs the Overtime Policy before being hired.

Still other companies allow their employees to consistently come to work late, or take leave without proper notification to management. We use the Absenteeism System and the Request for Leave System in our System100 Software that tracks and enables us to be proactive with any problem employee. This is to ensure we have consistent start times for production, and enough man hours to handle the scheduled hours for production.

Another reason some schedules may be shifted around is, a company does not have Time Keeping Software or Floor Data Collecting Software that reports on Actual Time versus Estimated Time (This is the estimated or actual time it takes for a job/work to go through production, from start to finish—also known as Throughput). They have never measured, benchmarked, adjusted, and then repeated these steps, until they have a very close Estimated Time for how long each process in the production cycle takes to complete. Therefore, they really don't know the throughput of a job—which makes the schedule a "guesstimate," at best. The actual time can only be measured after the job/work is completed, and then it should be used to benchmark for improvement.

Unravel the Mystery of Production Scheduling

In many cases, the Production Manager is also the Scheduler, and spends a lot of time trying to keep the schedule accurate, while fire-fighting in production. As you can see, trying to please everyone and handle the schedule, along with many system-busting events—or, as ISO would call it, non-conforming events—is almost an impossible task.

The Schedule Reports are normally not up to date; therefore, they are practically unusable. The reason these reports are sketchy is that, by the time the Production Manager sits down and inputs all the jobs into the schedule, more jobs are being added to production by Customer Service. Also, there may have been a slowdown in production at some process center, and the schedule does not reflect that. So—on and on it goes! This is why many large companies must have one or more persons overseeing the schedule at all times.

"Can the Customer Service Reps count to five?"

The production system I will be describing here is an example. I am not asking you to mimic it, or telling you how your production system should be built. This is how our company handled the production scheduling problem, and how we continue to improve it.

When our company grew to the point that we needed a Scheduling System as a tool for our Production Manager, we decided to use Scheduling Software instead of a Schedule Board. Both work in the same manner, except one is digital and one is a manual system. I told our Production Manager, that he would need to take the time to really learn the software to determine its benefits and limitations—then he would be able to design a system with no gaps to handle the constant changes in scheduling.

We had many systems in place to aid him in creating a great system for scheduling—not only the new scheduling software, but systems like our Production Driver System, Procedures, Policies, Daily Routine Checklist, Absenteeism System, Request For Leave System, and a Floor Data Collecting System. Sometimes it takes many systems working together to make one complete system—no gaps.

The Production Manager implemented the software to some extent, but what became evident was that he had not actually taken the time to learn enough about it. He became increasingly frustrated as production workers complained of missing jobs on their Schedule Reports. On some days, after employees completed all the jobs listed on their Schedule Reports,

and were ready to go home, the Production Manager would stop them and tell them they would have to work overtime. This was due to the fact that he had failed to list a job on their schedule, and the employee had to complete their process, in order for the next process to be completed on time. Other times, the missing job didn't show up at all on any schedule, until it was almost too late to meet delivery times. As I discussed earlier—this madness in scheduling is considered normal in many cases.

Frustrations continued to mount at our company, as our Systems were screaming that something was wrong—and employees submitted many System Buster reports through our System100 software, alerting us about scheduling problems. After my many attempts to help the Production Manager with his frustrations, and insisting that we take the time to fix the scheduling system, he resigned for personal reasons. I decided this would be a good time for me to take over the wheel of production and drive myself.

No sooner had I sat down to take over the schedule, when someone reported, via System Buster, we had missed a delivery date. To find out what happened, I called a meeting with the employees of a certain department. During this meeting, tempers were flying, some threatened to quit, and people blamed each other for the missed deadline. A woman, I'll call "Mary," looked right at me and said, "I know you didn't like the old Production Manager and the way he ran production—but at least while he was here, we never missed a deadline, until you took over!" Wow! That hurt! This atmosphere of mayhem and low employee morale was very disappointing to me, and it was all because the Scheduling System was broken. What a stark reminder of the havoc one broken system can cause.

I took a deep breath and responded to Mary's comment, "Mary, I liked him as a person, but you are right, I didn't like the way he ran production—like Freddy Fireman, barking orders and running up and down, stomping on fires with a non-systematic approach to scheduling." Do you see the results of what happens when a manager or a company doesn't take the time to fix problems by fixing the system?

I told all of them to calm down, and said, "Let's discuss these issues/problems one at a time." I reminded them again of how many things go right at our company, and this was just another system needing fixed. I told them I would spend as much time as it took to fix the Scheduling System.

We began to review the problems they had been encountering, such as the missing jobs on their Schedule Reports, people not working well with one another, and a few other issues. They said someone was needed to be on the floor in their department, directing them—to control these issues. I reminded them again that this was not the way our systems were designed to work. We prefer to manage the system, rather than manage people. I dealt with some issues in the meeting and asked them to please give me two weeks to fix the system that I believed would in turn fix their problems and bring order to their department. They agreed, although they were unconvinced that it could be done.

I went back to the Production Manager's computer to use the Scheduling Software and try to make sense of it all. I started to input a few jobs into the schedule module from the large stack of Job Tickets on the desk—and stopped. "This is STUPID!" I said out loud. "I'll be here for hours—this will never work!"

I began to have flashbacks of all the conversations I'd had with many vendors of software management systems. Many of them, when demonstrating their software, honestly confessed that very few companies used their scheduling modules. They explained to me that they were working on updates to fix the issues that companies had been complaining about. Some vendors tried to blame it on a company's ill-use of their software. There were other software companies developing what they called automatic schedulers. But what I saw immediately, thinking of the Scheduling Module of our Enterprise Software, was that it would involve several of our current systems coming together to complete the circle—a scheduling system with no gaps.

I asked my daughter-in-law Jennifer, who at that time was head of Customer Service, to come along side of me, learn our scheduling software, and brainstorm how to fix these problems. Along with me, she knew how all the systems in our Operations Manual worked, and how they can affect one another. My goal was to build the Production Scheduling System, to fix the problems in production, and to make Jennifer the new Production Manager. I needed all systems related to production working in concert.

I spent many hours reading the manual and becoming familiar with the Scheduling Module, and then I trained Jennifer. We spent several days placing the various job processes into the Scheduling Module. We ran tests by moving processes around, taking them in and out of the schedule, and printing out various Schedule Reports. These reports were to be given to each production employee for their work center, and the goal was to give them a current Schedule Report, by which they could manage their own work schedule.

As we began to dig into this schedule system, I suddenly realized how to take most of the scheduling load off the Production Manager, but retain the necessary controls.

I looked at Jennifer as we were working on the software and said, "It's as easy as counting to five!" She said, "What do you mean?" I said, "Can the Customer Services Reps count to five?" She said, what? I said it again, "Can the CSR's count to five?" She said, "Of course!" I then reminded her, that our normal turnaround was five to seven days—usually one process per day. We even have a procedure that lists the five processes, and which days they will be completed—all the way to ten or more processes, if necessary.

Yes, you can have less than a five-day turnaround system. We do it all the time!

Example:

Day 1-Process Center 1=Prepress-Plating

Day 2-Process Center 2=Pressroom

Day 3-Process Center 3=Paper Cutting Machine

Day 4-Process Center 4=Bindery-Folding, Stitching etc

Day 5-Process Center 5=Shipping or Delivery

I explained to Jennifer that if we have the Customer Service Reps enter the jobs into the Scheduling Module—since they already have the software program open and are entering data for the Digital Job Ticket—the Production Manager doesn't have to sit for four or five hours a day, chasing their tails, re-opening the program, locating every job, and entering them into the Scheduling Module. She said, "But the Production Manager needs to have control of the schedule, because some jobs are Rush—with one, two or three-day turnarounds—and some jobs are larger, so they require longer turnaround times, up to ten days.

I said, "You're right, but those jobs are not the norm, or the standard turnaround time at our company." I explained further that at least 80 to 90 percent of our jobs fit the standard turnaround. If, at some point in the future, the standard turnaround changes to three or even ten days, it would be easy enough to tweak or adjust the system. I told her we would begin by designing the system to handle the standard or normal turnaround. To give the Production Manager the necessary control over the schedule, the Customer Service Reps would have to notify the Production Manager by email of any job not in compliance with standard turnaround.

Jennifer brought up another issue: "What if Customer Service enters the job into the Scheduling Module as they create the Digital Job Ticket, and then the Proof Approval is delayed due to revisions made by the customer? How are we still going to make the scheduled due date?"

I reminded Jennifer again of our written policy that we give to customers, stating that—Day 1 of the production schedule does not begin until we have their signed proof in our hands. The first thing Customer Service enters into the schedule is that the Proof needs to be generated. This is actually Day '0'. They will not enter the rest of the processes into the Scheduling Module and start Day 1 of production, until this Proof has been approved. Now, you may be thinking, "Why not call this a six day turnaround?"

My question would be, "How can you ever start Day 1 of production, until you have Proof Approval by the customer. Until you have that, it is out of your control, and you don't gain control until the customer gives you that control. I am not suggesting you never agree to a certain delivery date, but I am saying the agreement should be made on the basis that you have a signed approval in-hand by a certain time, in order to start Day 1 of production. We even have a system in place to help the customer by reminding them that we have not received the Proof Approval. This is where Policies play an important role in training your customers on your systems. How will you ever gain control of your own schedule, if you allow the customer to take as long as they want to approve the Proof? Either you control your schedule, or they control it.

It's your decision!

Creating the Scheduling System

We trained the CSR's on how to schedule the jobs in the Scheduling Module of our software. This worked great, because they were already working in the software, entering data for a particular job—creating its Digital Job Ticket. They only had to click one button, and the Schedule Window opened up for easy dragging-and-dropping of the production processes into the Calendar of the Scheduling Module. It was easy as—one little, two little, three little Native Americans—four little, five little.....

We put new prompts on the Driver Checklist in the Customer Service portion:

- Signed proof received from customer—job has been scheduled.
- If this is a Rush Job, or job that will not fit standard production turnaround, Production Manager has been notified by email for approval of due date.
- Rush Jobs or Jobs that do not conform to standard production turnaround—scheduled according to Production Manager's instructions.

On the Production Manager's Daily Routine Checklist we added these prompts:

- Scheduled Rush Jobs have been reviewed in Scheduling Module.
- Scheduled Jobs that do not conform to standard turnaround have been reviewed in Scheduling Module.
- All Scheduled Jobs have been reviewed, and Production Schedule printed out for all Work Centers and posted in designated locations.

NOTE: Not only do we give each employee, at the various Process/Work Centers, a Schedule Report of the jobs they need to complete, we also give them a five-day preview of what the upcoming schedule will be. They know the preview will change as more jobs are added to the production schedule, and they will get that new, updated report the next morning and every morning.

On all Production Employees Daily Routine Checklists we added these prompts:

- All jobs on my schedule are marked as completed with a yellow highlighter.
- Job Number and Customer Name have been written on my Schedule Report for Jobs that I have completed in advance of upcoming schedules.
- I have placed this Daily Routine Checklist, my Schedule Report, and my Time Sheet in Production Managers office in designated location.

NOTE: If a production employee has completed today's schedule, but did not have enough work to fill their eight hours, an entry on their Daily Routine Checklist (like the second entry above) allows them to pull work from the next day's schedule (if the job is ready for them to do their process). For example: If tomorrow's schedule shows thirteen hours of work, and today's schedule has only six hours, we allow the employee to decide if they want to fill their eight hours, or even work overtime, to help them lighten the load and lessen their hours for tomorrow. The employee could pull three hours from tomorrow's schedule, and add it to their today's schedule, giving them nine hours for today, and ten hours for tomorrow. We have found that the employees, in many cases, work faster at their own discretion when they see heavier workloads. Also, they often have a tendency to pull work down without having to add overtime on the current day.

Another great benefit for the production employee, in managing their own work schedule, is that they know how to prioritize their workload in order to save valuable time, without having a direct supervisor. This gives them, not only a sense of pride, but some independence that, I believe, employees appreciate.

The only jobs on an employees Daily Schedule Report, that our Production Manager prioritizes, are the rush jobs. They are noted on the Report by a red asterisk, alerting the employee that these jobs are to be completed first—and, after that, the employee sets his own work schedule. There should also be a policy in place; whereby, the employee knows he must complete his schedule before leaving for the day or have special approval to have an un-completed Schedule Report.

The Production Scheduling System, as in the example above, is for a single-shift company. But with a little planning and tweaking, you could modify this for a two- or three-shift operation.

I will advise you, in order to solve the problem of scheduling, you will need several systems coming to together, in order to make a complete SCHEDULING SYSTEM—No Gaps.



Eli Goldratt, in his 1980s book *The Goal* wrote, “The basis of TOC (the Theory of Constraint) is that in every production process there are bottlenecks or constraints that determine the throughput of a factory or operation. Eliminating these constraints will greatly improve throughput.”

Some constraints are not as obvious as the bottlenecks described by Goldratt. Many of the problems that cause chaos or slowdowns in production, which I have mentioned in this document, and in my book *System Busters: How to Stop Them in Your Business* can also be considered “bottlenecks”—or what I call system-busting events. These can be easily fixed without adding more labor, purchasing new equipment, or—as in one of Goldratt’s stories—bringing out some old equipment from storage to open a bottleneck in production.

Did I mention—Great Systems Work!

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Contact Susan Beyer at Ebiz Products, 615-425-2652 or email susan@ebizproducts.com. Philip Beyer's book *System Busters: How to Stop Them In Your Business* is available at www.Amazon.com. For more about SYSTEM100™ software, visit www.System100.com.