



**This article is brought to you  
by TOCICO. Learn TOC -  
become a member today!**

TOCICO.ORG

# **Job Shop Scheduling**

## **The Secret**



## **to Getting On-Time & Reducing Lead Times**



*Learn what to do tomorrow to start  
improving your performance!*

**"Dr Lisa" Lang**  
AUTHOR



## **Job Shop Scheduling – The Secret To Getting On Time & Reducing Lead Times**

**By “Dr Lisa” Lang**

There’s no question that scheduling a custom job shop has it challenges. And every time we encounter one of the many challenges, our schedule is out of date, and we need to update the schedule.

In fact, don’t we spend A LOT of time updating the schedule? Here are just a few of the common scheduling challenges that cause us to have to continually update the schedule: <sup>1</sup>

1. Clients change their mind
2. Vendors aren’t always reliable
3. Mix can vary wildly and so our constraint moves
4. Employees do not always have the right skill and their discipline is lacking
5. Processes are not reliable
6. Machines & tools break
7. Quality is not near perfect
8. Data is not readily available nor accurate nor communicated
9. Communication between silos is difficult

But there is also no question that scheduling plays a big role in our on time delivery performance and our lead time. And our on time delivery performance, along with our lead times, determine our competitive position within our industry.

This is particularly true, as more and more, the shops that have survived have very good quality and lead the pack in expertise.

*Industry Week* reported that its 25 finalists for the “Best Plants” award reported an average on time delivery rate of 98.7%. And it’s no surprise that on time delivery is a critical aspect in achieving customer satisfaction, loyalty and greater sales.

---

<sup>1</sup> Taken from *The 9 Challenges to Scheduling Your Job Shop and Why Your Schedule is Dead On Arrival*, available at [www.VelocitySchedulingSystem.com/ebook](http://www.VelocitySchedulingSystem.com/ebook).

## But Custom Job Shops are NOT 98.7% On time

Custom job shops usually don't have the luxury of making the same parts over and over again. The mix of work and amount of repair/emergency work a shop has can change so dramatically week to week that their bottlenecks can move, making on time delivery a real challenge.



It's no wonder NONE of the 25 finalists were custom job shops or machine shops.

So, unfortunately 1) it's very difficult to schedule a custom job shop; and 2) it's very important that we do it well to be 99%+ on time and to reduce our lead times.

That's probably NOT new news. And I'm sure you've tried a number of things to improve your on time delivery and to reduce your lead times. You may have updated your ERP or scheduling software or used some Lean<sup>2</sup> techniques, or maybe you've hired an expeditor.

But, whatever you may have tried, my guess is that it may have helped some, but not substantially. And that's because the typical solutions address the various symptoms, but don't address the root cause.

So now you might be thinking – okay, so how do we address the root cause, what's the secret? How can we dramatically improve our scheduling?

## The Secret Is ....

to STOP focusing on efficiency. *Say What?!*

---

<sup>2</sup> According to an industry study, most machine shops rely on Lean to "improve". **But Lean Doesn't Work for Many Shops.** According to Taiichi Ohno (inventor of the Toyota Production System from which Lean is based), for Lean to improve on-time delivery, the processes, products and load must be stable for a "considerable length of time". And while this is true in the car industry -- who only allow model changes once a year -- this is not the case in machine shops.

And when you are willing to do that, and put a better scheduling system in place, you create a buffer to better absorb all those sources of variability (those 9 Challenges we talked about because we can't totally remove them).

It sounds like heresy, I know – but that's the secret. The cool thing is that if YOU'RE willing to give it a try and your competitors continue to cling to efficiency – you can create an incredible competitive advantage.

## **What does it mean to be efficient?**

The definition from Dictionary.com is "performing or functioning in the best possible manner with the least waste of time and effort." And I'd probably add money/cost to that.

One of the ways we typically apply efficiency in a job shop is by keeping all our equipment and/or people busy so that we don't waste any capacity and have the highest possible utilization.<sup>3</sup>

Now, to keep our key resources busy they all have to have a job to work on. And to increase the likelihood that all resources have work, we typically make all jobs in house available to be worked on.

"Available to be worked on" means included in our work-in-process or WIP.

This max's out your WIP and increases the pile of work at every work center. That way ALL key resources have a very high probability of having *something* to work on.

This is particularly relevant in job shops where the mix of work can change from week to week.

That's one of the things we do in the name of efficiency. Now let's talk about the negative effect from the actions that result from just this one thing we do in the name of efficiency.

---

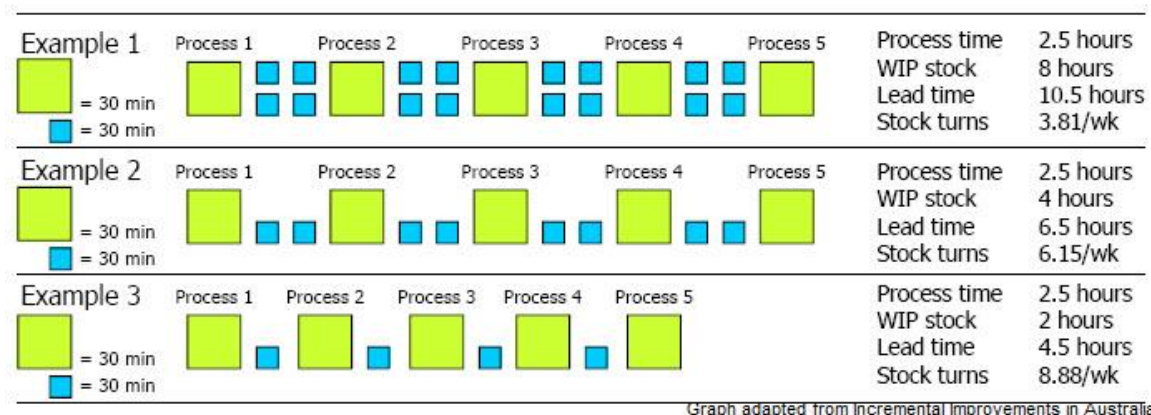
<sup>3</sup> Some shops focus on keeping people busy, some on machines and some try to do both. It doesn't really matter which you tend to do.

## The Negatives from "Being Efficient"

According to Little's Law there is a direct correlation between the amount of work-in-process we have and our lead time. The higher our WIP, the longer our lead times.

Here's an illustration showing the relationship between WIP and lead time:

### High WIP = Long Lead Time



The more jobs that wait for their turn the longer the average queuing time, leading to longer production lead times. Example 1 has the most WIP and longest lead time. And, conversely Example 3 has the least WIP and the shortest lead time.

So, as you increase WIP, you are also increasing your lead time, not to mention the amount of cash you have tied up in raw materials.

### But Wait, There's More ... On Time Delivery Decreases

The diagram does NOT include the effect of variability. But if it did, it would show that the variability of production lead time is increased as the queue grows.

So the effect of high WIP just gets more dramatic the more variability you have – the more you battle the 9 Challenges.

This directly reduces the on time delivery because it is more difficult to predict the exact production lead time and to confirm orders accordingly.

## **And ... Quality Decreases**

High WIP can also have an impact on quality. Many production failures occur early in the routing, but are detected much later in the production process (usually at final inspection).

If WIP is high, the average lead time is also high causing a long lag time between the production steps and the final inspection. That means that the final inspection step occurs a long time after the step that caused the failure.

And because so much time has passed, it can be difficult to determine and correct the root cause of the quality problem, making improvement very difficult.

Thus, the higher the WIP, the harder it is to detect and correct quality problems.

All of this brings me to the conclusion, that you must ...



## **Focusing on Efficiency**

As you stop focusing on efficiency and reduce WIP, here's what happens:

- Queue time reduces
- Lead time reduces
- Lead time predictability increases
- On time delivery increases
- Quality increases
- Cash flow increases



As a result of these improvements, your production lead-time becomes MUCH shorter (if you do it right) than your quoted lead-time. This difference can be used in 2 ways.

First, it creates a buffer allowing you to absorb a fair amount of variability and further enhancing your on time delivery performance. And second, the difference is so big that you can also afford to reduce the quoted lead time to customers.

The combination of these things – a shorter quoted lead-time AND 99%+ due date performance creates that competitive advantage I mentioned earlier. **WOW!**

### **That's Counterintuitive!**

Now, all of that is fairly easy to say and much harder to do. It's not physically hard to do, but mentally challenging because we don't have intuition around this approach.

I've only touched on one aspect of the negative effects an efficiency focus can have. There's more to understand to have a HUGE impact on your shop scheduling.

So I've put together a 47 minute webinar that explains the whole process – of specifically HOW to do this -- nothing is held back. It's called *How to Get More Jobs Done Faster* and you can sign up at [www.VelocitySchedulingSystem.com/webinar](http://www.VelocitySchedulingSystem.com/webinar). There are 2 dates to choose from, so I'll see you there!

Ooooh ... and while you're waiting for the webinar, why not go put some of this into practice right NOW?!



"Dr. Lisa" Lang is the President of the [Science of Business](http://ScienceofBusiness.com) and has recently worked with [Dr Goldratt](http://DrGoldratt.com) who is the father of Theory of Constraints and author of [The Goal](http://TheGoal.com). Science of Business specializes in increasing profits of highly custom job shops by applying Theory of Constraints, Lean and Six Sigma to operations with [Velocity Scheduling System](http://VelocitySchedulingSystem.com) and [Project Velocity System](http://ProjectVelocitySystem.com) and to marketing with [Mafia Offers](http://MafiaOffers.com). Questions? Comments? [DrLisa@ScienceofBusiness.com](mailto:DrLisa@ScienceofBusiness.com).



## Just some of the feedback:

- “We finished off our fiscal year end 10/31..... could have never turned things around w/out the VSS!!!!!! We finished the year in the black because ‘the board’ helped us focus on FINISHING! The last 6 months also saw a **serious improvement in on time delivery**, and an **increase in the volume** of orders thru our building... No job gets lost in the shuffle no matter how long it's in the building... THANK YOU!” *Tanya DiSalvo*
- “Dr. Lisa, Thanks to your program Velocity Scheduling System Gulf has **improved Delivery times**, **reduced rework**, **improved team work**, **improved cash flow**, and it has really **impressed our customers** with such a planning system they can actually follow the progress of their job as it progresses thru the shop. The **reduction in chaos** has to be one of the best benefits to the program. No more putting out fires all the time. The proper planning and scheduling has really improved this aspect of our operation. This would be great for any shop to consider.....as long as it's not my competition! Thanks again and we are looking forward to the Mafia Offer Program next Month.” *Vint Massimini Gulf Engineering Co. President*
- “After trying different solutions, including expansive scheduling software with years of implementation required, we finally found a system which delivers what promised! We **reduced dramatically (about 30%) our already good manufacturing lead times**, have a stable and reliable schedule and everybody in the plant **knows what to work on** at any point in time. There are so many great things about the VSSC but the key is that it's really fun and easy to implement because it engages the organization as a whole. Thanks Dr. Lisa!” *Alessandro Bernacchia Manufacturing Manager Guntert & Zimmerman*
- “Since the introduction of your velocity concept, we've seen an average of 5 jobs ship per week, which was about 1 every two weeks prior to the VSS Coaching (that's **10 X more job done**). Our backlog has gone from an average of 55 jobs to around 20 (while sales remained constant). We've also reached **100% on-time** performance for all new jobs booked since the VSS Coaching began. Another benefit realized is a steadier invoicing outflow and cash inflow.” *Rick Lightcap*
- “**Overtime has been reduced by 75% while increasing OTD to 95%** through this period...” *Steve Fleissner*
- “We **decreased the time it takes to get a job to get thru the shop**. Using the visual VSS board gives all the employees a chance to see what is going on.” *John Popescu*
- “This is the **best system for manufacturing** that I've encountered... Trust me I have seen and implemented many JIT, Lean Six Sigma systems in the past and this is the best.... Dr. Lisa, the creator and facilitator of the program, is top notch.” *Luis Fernandez, Schlumberger*
- “The Velocity Scheduling System has become the **centerpiece of our tool shop**. The simplicity of administration and visual nature of the system has been received well by the shop. **Jobs are finishing faster and deliveries are improving** thanks to the VSS Coaching Program.” *Eric*
- “Before starting the Velocity Scheduling System our on time delivery was about 68%. After implementation of the system we're currently running at **100% OTD**. The velocity board has been a great tool that provides visibility not only to myself but everyone in the shop. Daily 5 minute meetings keep everyone informed of how jobs are running and if there are any problems. This system has been a great help and we are **very happy with the results**.” *Richard Pothier*
- “After completion of the course our **on-time delivery has improved from 68% to 95%**. Using the VSS principals our goal is 100% by year end!” *Tim Merrifield*
- “Dr. Lisa has provided us with a flexible shop "Operating System" that has provided many benefits to both our engineering and production departments. **Chaos is down; visibility and speed through the shop are up**. This allows management to make clearer decisions for both product planning and overall corporate strategy. I

would definitely recommend the Velocity Scheduling System to other shops that know that they should be doing better. Dr. Lisa has the experience to show you how.” *Clinton*

- “Identifying bottlenecks and decreasing work in process definitely helped **improve throughput**.” *Kirk*
- “The program has helped **reduce the chaos** in our shop. The communication has dramatically improved to **help the work flow** through the shop.” *Overton Industries*
- “Velocity Scheduling is an amazing program. It teaches you about your process, helps you find out what are the major issues and focuses on one common goal for everyone, **improving flow**.” *Luis*
- “Our business has suffered from low sales for a number of months. A business review recommended that we install a visual job scheduling system that could be understood and implemented by the shop floor employees. The VSS system satisfied this admirably. The large display is very clear and it is obvious to see the jobs that are progressing, delayed, late, etc. It has changed the focus to completing jobs rather than starting jobs that then progress slowly because of the backlog of work in process. The supervisors were doubtful at first about whether this system would work but were willing to try it out to achieve some improvements. The **reduction in time required to complete a job** has now been translated into our quoting system so that I can quote a lower number of hours to complete the task, hence a lower price for the customer **which gives more sales and a higher throughput**. More improvements will happen as our sales increase. Do I want to give away my competitive advantage and tell other shops of how to achieve more work faster? - Not likely!” *Rob Mantach*
- “I have seen a **serious improvement in the past two months for on Time Delivery**, and **less chaos** thru out the Shop. We have cut our "Work In Process" by 40% as far as I can tell and **no Job is getting lost** in the shuffle no matter how long it's on the floor. So as you can see we have a way to go, but I know we are on the right track.” *Ralph*
- “Upon implementing the VSS, we noticed the following benefits: **reduced WIP by more than 50%**, **learned we can do more with much less**, and we **increased visibility** for project management and production that has led to a **reduced cash flow cycle** and **happier customers**! I recommend the VSS for any job shop that struggles with managing schedules, inventory, and chaos within the manufacturing environment. If you sign on with Dr. Lisa, she will give you the tools you need to get it under control and achieve outstanding results. Thank you, Dr. Lisa!” *Matt Groves*

## Copyright:

**Copyright © Science of Business, Inc. All rights reserved.**

**Velocity Scheduling System is service of [Science of Business Inc.](#)**

No part of this publication may be reproduced or transmitted in any form or by any means, mechanical or electronic, including photocopying and recording, or by any information storage and retrieval system, without permission in writing from the publisher.

Requests for permission or further information should be addressed to the publisher:

**Throughput Publishing**

email: [sales@ThroughputPublishing.com](mailto:sales@ThroughputPublishing.com)