

SPEED TO MARKET

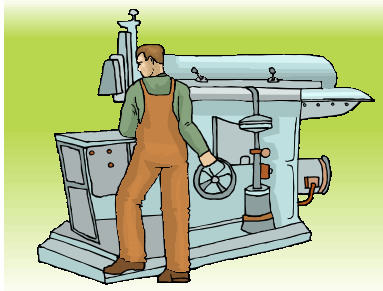
The Newsletter for Job Shops and Order-Driven Companies

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Feature Article

A Job Shop is Not a Factory



An airplane and an automobile are both means of transportation, but are not operated in the same way. The same is true for job shops and factories. They are both means of manufacturing, but are not operated or managed in the same way either.

Mass Production is the Dominant Paradigm: Most of what we have learned about manufacturing management is derived from mass production operations, and virtually all management education assumes mass production to be the norm and standard manufacturing model. Little or no attention is given to job

shops and custom manufacturers which are basically ignored in the management literature. The following table illustrates important differences between them.

<i>Job Shops</i>	<i>Mass Production</i>
• Make to order/custom	• Build to stock
• No finished goods inventories	• Finished goods inventories/SKU's
• Different products	• Standard products
• Sell to other companies	• Sell to distributors or end users
• Customer order driven	• MRP demand forecast driven
• Bid on RFQ's to get work	• No RFQ's
• Estimating is critical	• Standard costing
• Customer pricing (quotes)	• Market pricing
• Lead time required	• Fill orders from inventory
• Many schedule changes	• Fewer schedule changes
• Set ups/changeovers frequent	• Set ups/changeovers less frequent
• Direct contact with customer	• Indirect contact with customer
• Smaller companies	• Larger companies
• Owner managed	• Professionally managed
• Variable overhead allocation	• Labor-based overhead allocation
• Variable volume	• More stable volume
• Order backlog is good	• Order backlog is bad (stock outs)
• More dynamic	• More static
• More skilled labor (variable tasks)	• Less skilled labor (repetitive tasks)
• Dynamic scheduling	• Level scheduling
• Shorter runs	• Longer runs
• Improve by reducing lead time	• Improve by reducing inventories

I like it (Speed to Market). It's to-the-point, plain English, and dead-nuts on.

Don Williams, Manufacturing Manager. Kennetex, Inc.

Toyota Lean is Inappropriate: This list of comparisons is a first step in understanding the unique characteristics of job shops so that real solutions can be created for real problems. For example, if you understand the significance of the following rows in the matrix, you will know that “Toyota Lean” is not appropriate for job shops because:

- 1) Products are made to order (a job shop already operates as a “pull system” in lean terminology);
- 2) There are no finished goods inventories (reducing finished goods inventories is a major objective of lean programs); and
- 3) The manufacture of different products is at odds with a standardized workflow.

<i>Job Shops</i>	<i>Mass Production</i>
• Make to order/custom	• Build to stock
• No finished goods inventories	• Finished goods inventories/SKU's
• Different products	• Standard products
• Improve by reducing lead time	• Improve by reducing inventories

If you understand the next set of differences, you will know not to rely on Goldratt’s Theory of Constraints as your solution either.

<i>Job Shops</i>	<i>Mass Production</i>
• Many schedule changes	• Fewer schedule changes
• Variable volume	• More stable volume
• Dynamic scheduling	• Level scheduling
• Shorter runs	• Longer runs

Why? Because constraints or bottlenecks are moving targets in a job shop environment. Bottlenecks are created and disappear hourly with changes in customer priorities and schedules. An operator fails to show up for work—a bottleneck is created. A customer changes a specification—an existing bottleneck may disappear, and a new one may or may not be created. The progress of an order through a shop often has any number of starts and stops that have nothing to do with constraints. The drum–buffer–rope technique, central to the theory of constraints, is not particularly useful in the dynamic world of the job shop vs. a more stable volume production environment where a constraint is more likely to stay put.

Problems in Search of Solutions...Not Solutions in Search of Problems: Typical problem areas in job shops include how to get production planning and scheduling under control; how to constantly improve the accuracy and responsiveness of estimating and quoting; how to improve on–time delivery; how to increase cash flow and reduce the need for working capital; how to recognize and exploit new markets and increase sales; how to allocate overhead fairly; how to manage capacity with a roller coaster workload; how to achieve continuous improvement without a costly bureaucracy; how to cross–train operators and increase the flexibility of the work force; and how to reduce lead time and serve customers more quickly, to name a few. The obvious question to ask is: “How does the latest management fad address these kinds of real problems job shop owners and managers face every day?”

J. M. Juran, a pioneer in the quality movement, warns of the danger posed by people with solutions in search of problems: “Tool–oriented people approach problems with so heavy a bias they should not be given the sole responsibility of choosing where they are to direct their efforts.”¹ This is similar to the old saying, “when you have a hammer, everything looks like a nail.” Job shop owners and managers should be clear about how a proposed approach will benefit them. Why? Because when you are not clear about how the “solution” fits your business, you are going to get hammered. Guaranteed.

¹ Juran, J. M., *Managerial Breakthrough*, McGraw–Hill, New York: 1964 pp 88–89

Another person weighing in on the same subject is Larry Ellison, chief executive of Oracle Corp. quoted in the Wall Street Journal:

Mr. Ellison believes that tech firms have sown the seeds of their own demise by developing ever-more-complex "solutions" before identifying problems. Then, he says, tech firms try to fob these tough-to-use products onto unwitting customers. "We became the largest industry in the world by selling things that people didn't want to buy," he says.

Larry Ellison' s Sober Vision: Tech Industry will shrink, 1,000 companies will fail, Predicts Oracle' s Feisty Chiefn the Wall Street Journal, April 8, 2003

The point here is very simple. Job shops are different. They do not operate like mass production manufacturing businesses, so there is no reason to expect that factory solutions will work in job shop environments. (They mostly don't even work in factories either which is why there are so many flavor of the month programs in these environments.)

This seems to be lost on those who seek to perpetrate the latest cure—all on unsuspecting job shops. A few who are pitching canned “solutions” know better, but most are blithely ignorant of the differences between these two production technologies, and the implications of these differences. Whether they are ignorant or just plain greedy, those practitioners who promote bogus solutions to nonexistent problems are in direct violation of the Hippocratic Oath: “Do no harm.” Because, and make no mistake about it, imposing “solutions” where they don't fit and can't work creates unsolvable problems, rendering even the most technically proficient shop noncompetitive in the long run. All we can say is be very careful before you jump on the next fad bandwagon or computer solution coming down the pike.

Mr. Bozzone addresses the issues around his topic with clear and direct prose that reflect his even more clear and direct thinking.

Donald A. Keal, Principal, Joshua Jordan Associates

Six Sigma in a Job Shop?

Remember that Bridge in Brooklyn We Wanted to Sell You...



Six Sigma reminds me of a line in Kurt Vonnegut's [Breakfast of Champions](#) when the hero, Kilgore Trout, asks a man why he chose to name his company, *Pyramid Moving*, given the pyramids have not budged a quarter of an inch in over five thousand years. “I liked the sound of it,” he said. And so it is with Six Sigma. Somebody must have liked the sound of it because, like moving a pyramid, it presents an impossible goal.

Six Sigma is a statistically-based scheme for preventing defects that is strikingly similar to Total Quality Management (TQM), the previous fad du jour in the quality world. Its name is derived from the standard deviation of a normal distribution or bell curve which statisticians refer to with the Greek letter “sigma” (σ). Six Sigma refers to three standard deviations on each side of the mean which covers 99.997% of the area under the curve. In practical terms, operating at a Six Sigma level of performance means defects cannot exceed 3.4 parts per million.

Six Sigma, a Motorola creation, has become wildly popular with over 100 Six Sigma titles on Amazon.com's product list. (This level of popularity in itself should make you a little suspicious.) Six Sigma takes TQM a step further by introducing the concept of green and black belt process improvement specialists who are dispatched to address problems across organizational boundaries. These types of cross-functional problems are really failures of organization design, especially the failure of the design to enable the effective management of interdependencies.

A skeptical observer might say that Six Sigma is no more than a band-aid for poor organization design. It deals with symptoms, not underlying causes. But even the band-aid analogy is misleading as it suggests a positive treatment. Certainly this judgment would bring howls of protest from Six Sigma devotees, but the fact of the matter is that quality is a multi-billion-dollar-a-year industry that employs lots of people. Finding objective experts who are not blind adherents to dogma (the tool-oriented people Juran refers to), is a challenge to say the least.¹

So what does a goal of 3.4 defects per million have to do with a job shop that may make one, or at most a few dozen items? Nothing...and that's the essence of the problem. Six Sigma, like other schemes concocted in large manufacturing organizations, has little or nothing to do with improvement in a job shop environment.

The widespread proliferation of Six Sigma is just another indication of the more fundamental problem we discussed in the previous article, *A Job Shop is Not a Factory*, and have been bringing to your attention through our articles, workshops, books, and educational materials for the last few years. The problem is this: *manufacturing management concepts derived from volume production operations are the wrong tools for managing a job shop business.* They create more problems than they solve because they don't fit, don't work, and will not produce the results you want or expect. So before you blithely go down the Six Sigma path in your job shop or order-driven company, think about the answer to Kilgore Trout's question.

¹ An exception is [*Optimizing Quality in Electronics Assembly: A Heretical Approach*](#) by Jim Smith and Frank Whitehall (McGraw Hill). This book provides a far more comprehensive treatment of quality than the title would indicate (although a significant portion discusses the science of soldering). It's based on the wisdom of using an organization design framework in which quality is integral to managing the business, not imposed as an overlay on top of it. If you are really serious about implementing effective quality management in your organization, or upgrading your current system, you must read this book.

A Note on Organization Design: The term "organization design" is typically thought to mean organization structure, but we use it in a broader sense. For example, we have shown in *Speed to Market* and in this Newsletter that a job shop can have several businesses under the same roof (such as an emergency repair business, an engineered products business, and/or a build-to-stock business). An organizational design approach would clarify the interdependencies among these businesses, and would propose suitable processes and structures to effectively separate and manage them. In contrast, Six Sigma slaps on a layer of green and black belt coordinators which adds overhead. These coordinators can easily make problems worse by pushing for improvement without understanding the overall business, or the inherent interdependencies that must be managed. Remember, the people who are bringing you Six Sigma are the same people who are bringing you Dilbert every week.

The questionnaire used for shop assessment is a valuable tool. Use of actual client experiences is a highlight of the book. Professor S. A. Irani, Department of Industrial, Welding and Systems Engineering, Ohio State University

The Need for Speed

Kurek Tool, Inc.



This is the first in a series of articles describing how *Speed to Market* is being implemented in a job shop.

Background: Kurek Tool, Inc. (KTI) was established by John Kurek and his sons John, Jr. (Jack) and Jerry in 1965. The Company has grown from its humble origins in a garage, to a 7,000 square foot building with some 40 pieces of machinery and equipment. KTI specializes in manufacturing limited run prototypes, tooling, and precision machining. KTI is dedicated to superior customer service, and provides fast-track service for urgent orders, as well as a 24/7 contact number for night and week-end emergencies. KTI is ISO 9000 certified.

Jennifer Kurek-Clor is the Manager of Infrastructure Development and Special Projects at Kurek Tool, as well as one of the three sisters who are responsible for managing the business. She speaks to the situation at the start of our project.

KTI was in a rut, and in any business, that is not good. The strategic plan wasn't working, sales and profit were down, process improvements that had been attempted in the past had failed, morale was low. The future looked bleak.

A decision was made by the owners, my father and uncle, to buy some new, high tech equipment that would put us on a more even playing field with our competitors. The management team, consisting of the shop superintendent, myself and two sisters, said fine, but only if we can make some radical changes in the company.

Luckily, we had acquired a training grant from the Michigan Economic Development Corporation, and had funding to assist us in getting some "help in here." Having been burned by consultants in the past, the owners had a bitter taste in their mouths and were extremely hesitant. We knew we needed training in capacity management—balancing hot jobs with quoted deliveries, as well as dealing with the added capacity created by new equipment. We also needed to get a handle on the chaos on the manufacturing side, and the uncertainty regarding the direction of the company. Roles and responsibilities needed to be re-defined, and general performance improvements had to happen.

So the search began. We knew that any training we undertook had to have a significant impact on the shop floor, as well as the overall performance of the business. I scoured the course guides offered by local colleges and continuing education facilities, and couldn't find anything specific to job shop management. I called firms specializing in productivity improvement, but their methods were geared toward high volume manufacturing facilities. Then I remembered Delta Dynamics. We had purchased their book, Speed to Market: How to Cut Lead Time and Increase Profits in Job Shops and Custom Manufacturing Environments by Vincent Bozzone, some time ago, and we were on their newsletter distribution list. I contacted him to find out what kind of light he could shed on our situation.

In some ways we really hoped Vincent would come in with a magic formula and fix the problems that we couldn't seem to get a handle on... but he doesn't work that way, and in hindsight, that wouldn't have worked anyway. The approach was more like "Let's look

at what we're doing and ask: Does this make sense? Where is the excess? The waste? How can we do it better? Smarter? Faster? What is going to work for us?" Delta Dynamics' approach was determined by our needs, and not by the requirements of a canned program which is so typical of many consultants.

We received a call from Jennifer and drove up to Saginaw to meet with her, her sisters Jane and JoAnn, Uncle Jack and Dad Jerry at the end of January. They described their situation as they saw it, and a number of specific objectives were identified during this meeting:

- Improve Customer Service and On-Time Delivery Performance
- Re-Define the Organization Structure, including Roles/Responsibilities of Key People
- Improve Work Flows and Efficiency
- Address Leadership, Succession, and Training Needs

Generational Transition: As we got started, it soon became clear that an overriding need was to develop the organizational infrastructure and management training that would enable the next generation of the Kurek family (Jane, Jennifer and JoAnn) to manage this business effectively and achieve their objectives. This would let Jerry and Jack Kurek continue their involvement in the business, but without the same responsibilities for its day-to-day management as they had assumed in the past, an important step in the process of transition to the next generation.

The first objective on our part was to gain an understanding of the business. It soon became evident that two businesses (or value streams) were operating under the same roof. One was referred to as "quoted work", and the other "time and materials jobs". The prevailing opinion was that time and materials jobs, which tended to appear unexpectedly and have a high degree of urgency (short lead times), were pushing quoted work out of the way, and making these jobs late. (Later we would find this was just a symptom of a more fundamental problem. KTI lacked an effective way to manage capacity given the variable workload characteristic of job shops and similar order-driven businesses.)

Laying the Foundation: We started laying the foundation for *Speed to Market* by examining the main business processes and computer software interfaces. We used the brown paper technique (see Appendix C in [Speed to Market 2nd Edition](#)) to gain an understanding of how KTI converted "quotes to cash" through its business process. At the same time, we looked for opportunities to streamline these processes and eliminate unnecessary paperwork or steps. Much to everyone's surprise, there was little nonessential paperwork in the system. Some streamlining was possible and this was accomplished. The most important outcome of this systems review was a shared understanding of how the business actually worked, and where to establish critical control points.

We also started the process of designing and installing a weekly performance report, another important foundation piece. This would provide the management team with "real time" information on key measures they needed to run the business.

We realized the existing performance measurements weren't effective and questioned the integrity of the data. After working on cleaning up some data collection processes, we moved forward in collecting and analyzing data relative to the key indices the weekly performance report was built on. Much to our surprise and delight, this exercise was actually fun! To see such critical performance information as dollars quoted/won, the mix of quoted work v. time and material jobs, on time delivery, productivity, and more—all contained in one report—was incredibly enlightening to us. The dynamics of the interrelated factors at work are striking, and seeing these truly changed our perspective on running the business, as well as generated new levels of discussion among the management team.

At the end of the first two weeks of this project we had a fairly good understanding of their business with its two primary value streams, a defined “quotes to cash” business process, an understanding of what information was available in their computer system (and what was lacking), a good start on designing and implementing a weekly performance report (and managing the quotes to cash business process with the data the report provided), as well as training for the management team in the concepts and methods specific to managing a job shop/order driven business.

In the Next Issue of *Speed to Market*: Tackling the organization structure, improving the estimating process, closing the loop on the floor, and owners Jack and Jerry Kurek’s reactions to a proposed laundry list of changes.

News and Notes

Job Shop Management 101 Course... The job shop management course we have been developing since last December is ready to go now that we have found a home for it at [Saginaw Valley State University](#). This innovative course is organized as a series of modules that combine job shop specific management education with “back home” implementation assignments to put learning to practical use. It is an efficient, reasonably-priced alternative for training key people, solving real problems, and bringing about measurable improvements in job shops and similar order-driven businesses. If you are in the Saginaw–Flint–Bay City area, call or e-mail us for a free session and schedule.

Here' s the Truly Insidious Aspect of Six Sigma magically transforms into whatever you say it isn't. For statisticians, it's a statistical tool. But if it's statistical validity is attacked, it becomes a non-statistical management tool. Claim it's too structured, and it immediately becomes unstructured. And so on. It's like punching a marshmallow—it pops right back out. Trust me on this; I've been there since the beginning. (Personal communication from [Jim Smith](#), Author, *Optimizing Quality in Electronics Assembly: A Heretical Approach*.)

Feedback Please: The *Speed To Market Newsletter* is now e-mailed to over 1000 people every month, and the list is growing thanks to referrals and requests. We appreciate the feedback and suggestions we've received from readers, and want more because this is how we develop content. Several articles in previous issues were the direct result of e-mails, calls from readers, or direct work with clients. For example, *To Tell or Not to Tell?* and *When Customers Try to Run Your Business* ([April Issue](#)), *MRP in a Job Shop?* ([March issue](#)). If there is a subject you would like us to tackle, or have an anecdote to share, or a question that's bothering you, call us or send an e-mail. Thank you for your participation.

DuPont Conference Rescheduled...The *DuPont Surfaces 2003 Fabrication Conference* originally scheduled for April 3-6, Marco Island, Florida was postponed due to the war in Iraq. We are pleased that it has been rescheduled for October 2-5 in the same location. Delta Dynamics will deliver a *Speed to Market Workshop*, as well as participate in the related Technology Fair.

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