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# SPEED TO MARKET

*A Newsletter for  
Job Shops—Niche Manufacturing—Focused Distribution Systems  
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*Printer Friendly Version  
Feature Article*

## Changing the Ground Rules

*How to Cut Lead Time in Job Shops  
and Custom Manufacturing Environments*

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Job shops and custom manufacturing companies, long hammered by intense competitive pressures to cut costs and improve quality, are now being compelled by their customers to deliver faster—in effect, to cut lead time. Cutting lead time is easier said than done, however, and many companies find they have little in the way of tangible results to show for their efforts. This article outlines seven fundamental changes in your organization’s ground rules that are required if you are going to make real progress in shortening your lead time (or “customer wait time” as it might more accurately be termed).

**Understand Lead Time:** When seeking to reduce lead time, many companies focus almost exclusively on the shop floor and ignore the rest of the organization. That is a serious mistake, as any manufacturing manager knows. For example, late orders coming to the shop contribute to missed ship dates, but are outside the shop floor’s control. Defective orders (e.g., inaccurate, illegible, missing critical information, lacking materials or not reflecting the latest engineering changes) also contribute to missed ship dates.

Lead time encompasses the entire time span from initial customer contact to product delivery—what we refer to in a shorthand kind of way as “quotes to cash.” You have to get beyond the shop floor to have any appreciable impact on reducing lead time. Therefore, meaningful improvements in customer wait time and shipping reliability require company-wide reevaluation that takes the entire business process into account.

**Recognize You are in a Service Business:** Few people understand that job shops are service businesses. Making a product to a customer’s specifications is a service that just happens to come in the form of a manufactured item. This may not be fully recognized because the company primarily focuses on the manufacturing technology and processes employed. This is not a matter of semantics; customers place a premium on fast service. Those companies that truly understand they are in a service business are best positioned to exploit speed to market as a competitive advantage.

### Change Your Mental Model:

If your mental organizational model looks like a traditional organization chart with lines, boxes, and divisions among functional departments, you will be frustrated in your attempts to reduce lead time. The traditional organization hierarchy is static, providing no guidance for action. The newer dynamic “organization as process” model which shows the series of steps required to convert “quotes-to-cash” works much better.

These steps include sales, estimating, winning bids, pre-production activities (e.g., purchasing, materials management, engineering, scheduling), floor operations, shipping, and converting accounts receivable into cash. The objective is to design and manage this process so that it flows smoothly and efficiently. Lead time is reduced when delays are eliminated throughout, and teamwork across functional areas is the norm.

### A Typical Job Shop Business Process



**Understand the Difference between Task Time and Chronological Time:** The focus in business has traditionally been on reducing task time because it is paid for by the hour, and productivity (more output per hour with the same resources) has a direct bearing on profitability. Chronological time, on the other hand, refers to the process time (or clock time) required to convert a customer’s order into a shipment.

The costs of chronological delays in your business process are hidden and difficult to measure. Everyone knows what happens to bottom line profitability when a company reduces labor costs. Not obvious—but every bit as important—is how many orders you lost last year because somebody else could deliver to your customers faster. You’ll never know, and those lost sales and lost profit dollars will never show up on your income statement.

**Actively Manage Capacity:** Lead time is not fixed and varies with backlog. The larger the backlog, the longer the lead time for new orders coming into the system. At the same time, you must be able to manage capacity to maintain reasonable order backlog levels and lead times when sales increase. There are a number of strategies you can use to expand and contract capacity to maintain or reduce lead time in the face of variable demand. Overtime, increasing workforce flexibility, adding shifts, and outsourcing work are a few.

For a more detailed discussion, see [Do You Know How to Play the Accordion? Managing Capacity in a Job Shop Environment](#) (Society of Manufacturing Engineers, *Forming and Fabricating Magazine*, March 2003).

**Permanently Eliminate Delays:** Cutting lead time is achieved by:

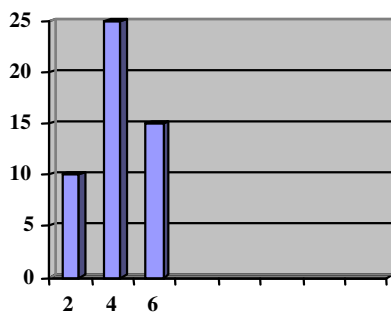
- Examining each step in the quotes-to-cash business process
- Identifying delays
- Making the delaying steps explicit, and
- Gaining widespread involvement to review, critique and revamp as required

By doing this, delays can be eliminated systematically and permanently. This essential, systematic improvement process can be tedious and time-consuming—especially while running your business. Getting skillful help generally makes all the difference between success and failure.

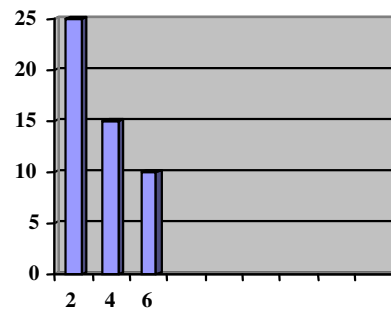
**Measure Results:** Typically, lead time is calculated by dividing the order backlog by average weekly shipments. For example, a shop with \$4,000,000 in annual revenues ships roughly \$77,000 per week. At a backlog level of \$350,000 (booked business), the average lead time for new orders coming into the system would be 4.5 weeks, and your sales department may be quoting six, seven, or even eight weeks just to be on the safe side. Or, they might be quoting three weeks because a short lead time is required to get the order. This is far too vague a measure to provide your customers with accurate lead time information...and too-long lead times cost you sales!

A more accurate and informative method for measuring lead time is velocity (speed at which an order moves through your business from order entry to ship). Velocity is calculated by determining the number of days between the order entry date and the ship date; the fewer the days, the faster the velocity. The easiest way to do this is with pure calendar time, not the number of workdays. For example, an order entered on September 3rd and shipped on November 11th would have a velocity of 38 days.

Calculating order velocity as in/out time for each order provides the data you need to construct a histogram, a tool that will give you a different perspective on your lead time performance. The following histograms show the number of orders shipped each week. The graph on the left shows that ten percent of all orders were shipped in two weeks or less with an average lead time of 40 days. The graph on the right shows improvement — twenty-five percent were shipped in 2 weeks or less with an average lead time of 34 days. Looking at performance with a histogram shows improvement more clearly (vs. comparing 40 to 34 day averages which doesn't provide as much information).



**Average Lead Time = 40 days**



**Average Lead Time = 34 days**

**The Need for Speed:** Cutting lead time is essential if your company is to remain competitive in today's business environment in which customers are demanding faster service. But cutting lead time is also a powerful performance and profit improvement strategy that will increase sales, reduce costs, accelerate cash flow, and increase effective capacity all at the same time—it yields multiple benefits.

Cutting lead time is easier said than done, however. Effective lead time management requires a change in the ground rules of your organization, and is an ongoing process, not a one time event. Changes in thinking, as well as the disciplined application of process improvement methods are required. Above all, job shops must be recognized and managed as service businesses that just happen to manufacture things.

The sooner and more clearly the service nature of the business is understood, the sooner a job shop can get on the fast track to profitable growth. Companies that can respond to customers' needs more quickly than their competitors will survive and prosper. Those that cannot will fall by the wayside. It's that simple.

This piece was originally published in the February 2004 issue of [Fabricating and Metalworking Magazine](#) Click on the link to get a free subscription.

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## Measuring Organization Performance

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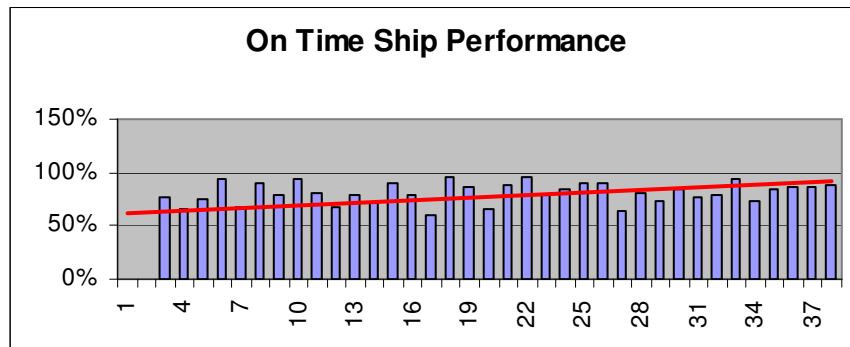
In the article, [What is a Good Hit Rate? Are You Getting Your Fair Share](#), (October 2003 Issue of Speed to Market) we discussed how to measure performance in estimating. In this article, we turn our attention to another section of the [Weekly Performance Report](#), *Shipping Performance*, and discuss metrics that will provide information on how well your organization is doing overall.

Referring to the matrix below, *Key Metrics* refers to the performance measures you have established for your business. *UM* refers to Unit of Measure. *Current Week* is used to enter data for the current week. *Average Week* is the sum of all previous weeks divided by the current week number. *Year to Date Cumulative* is the sum of all previous weeks (excluding percentages which cannot be added). *Annual Run Rate* is the *Average Week* multiplied by 52. It projects a year end result based on average year to date performance for each performance measure.

Key Metrics		Current Week	Average Week	YTD Cumulative	Annual Run Rate
<b>Shipping Performance</b>	<b>UM</b>				
<b>Jobs Shipped</b>	<b>#</b>				
<b>Jobs Shipped Late</b>	<b>#</b>				
<b>On Time Ship Performance</b>	<b>%</b>				
<b>Jobs Actual Cost Over Estimate</b>	<b>#</b>				
<b>Jobs Actual Cost Over Estimate</b>	<b>%</b>				
<b>Cost &gt; Price</b>	<b>#</b>				
<b>Dollars Lost</b>	<b>\$</b>				
<b>Order Velocity (Average Lead Time)</b>	<b>Days</b>				

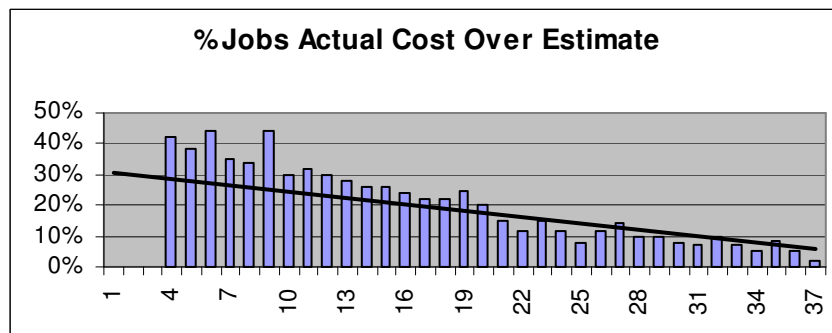
In the first section we record the number of jobs shipped for the week, along with the number shipped late. This enables on time ship performance to be easily calculated and trended.

The following graph shows an improving trend in on-time ship performance as a result of implementing *Speed to Market* in a job shop. The scale on the bottom is in weeks. It took 2 weeks to get the report installed, and in the 4<sup>th</sup> week performance was worse than the third week. The red line is a trend line to see how performance has improved overall. The data for the weeks in this shop jumped around a lot so it's important to look at the trend as well as the data for each week. Weekly review meetings are used to interpret the data so that management and key people can understand what is going on, and take appropriate corrective actions as required.



**Jobs Actual Cost Over Estimate:** In this section, we measure and track the number and percentage of jobs that came in over the original estimate. We refer to this as “closing the loop.” It is extremely important to compare the estimated to the actual results on an order-by-order basis as one element in a continuous improvement routine. If a business system does not provide the means to compare actual costs against the estimate, it is impossible to focus problem solving and continuous improvement on specific areas of need. *Were materials costs higher than estimated? Did we have more scrap than expected? Was the actual shop floor routing different from the one used in estimating? Were labor costs higher than estimated? Why?* Without proper information, these questions go unanswered, and we won't know if an overrun was caused by a bad estimate, or a problem on the floor. Without closing the loop, the same conditions can occur again and again, order after order, without ever being corrected.

The percentage of orders where costs exceeded estimates can also be graphed and trended to determine whether or not continuous improvement efforts are effective.



**Cost > Price:** There are times when the actual cost of producing an order is not only greater than the estimate, it's also greater than the price charged to the customer! This is important to

keep an eye on, including the total dollars lost from these occurrences. Again, this measure can be trended and graphed.

Finally, *Velocity* is a measure of lead time and shows how quickly your shop can convert quotes to shipments. This is discussed previously, so there is no need to say more here.

These types of measures and other that are included on a *Weekly Performance Report* provide the information you need to get and keep a handle on the pulse of your business, and to know when performance is not up to par. Getting this information weekly enables you to take action quickly when problems are smaller and easier to manage, rather than getting blindsided when problems have grown to the point of being out of control and major crises.

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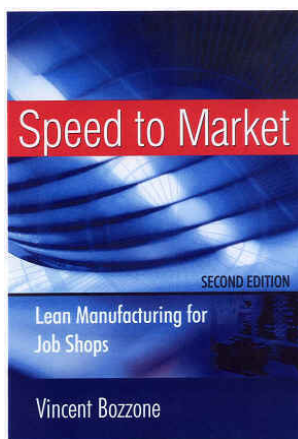
## News and Notes

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**Crisis in American Manufacturing** Jim Schollaert, Director of Strategic Outreach and Senate Relations for the American Manufacturing Trade Action Coalition ([AMTAC](#)), will deliver a presentation, *The Crisis in American Manufacturing*, at Mott Community College's Regional Technology Center on Wednesday, February 25th from 8 to 10 am in Flint, Michigan. Call (810) 762-0968 to make a reservation if you want to know: *How did we get here? Just where are we now? What can we do about it?* Space is limited so act now.

**Changing the Ground Rules Workshop** We conducted this workshop in association with the Michigan Tooling Association on February 3<sup>rd</sup> at MTA Headquarters. Feedback was good, and we've conducted a number of on-site organizational reviews with participants since then, and are finding many opportunities to assist companies in becoming more competitive and efficient. We are also in the process of reframing our do-it-yourself mini-project program in order to deal with the varied situations presented by individual shops. Stay tuned as we go back to the drawing board.

**Delta Dynamics Mission** To provide job shops and custom manufacturers with the expertise and hands-on implementation support required to improve performance and profitability in a lean manufacturing world. Learn how we advance our mission with job shop specific products and services by browsing through our content-rich website — [www.deltadynamicsinc.com](http://www.deltadynamicsinc.com)



**Order Speed to Market** If you haven't read *Speed to Market: Lean Manufacturing for Job Shops* yet, what are you waiting for? It's costing you a lot of money not to read it!

*Having experienced first hand the positive impact of Speed to Market on the Robert Mitchell plant, I am constantly amazed by how much ANY job shop is missing by not implementing these simple but very effective tools.* **M. Nawar, Chief Engineer, Robert Mitchell Company, Montreal, Canada.**

*When I took over this business from my Dad, I searched high and low but could not find any practical information to help me run my business until I discovered Speed to Market.* **Laurie Moncrieff, Owner and President, Schmaid Tool & Die, Flint, MI**