



More on Lean Manufacturing... What's Your Setup Time?

By Barrier Advisors, L.P.

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What do the following situations have in common? Imagine you are at a bar, waiting in line to order a drink. The bartender asks the person in front of you what they want, and they respond with, "Let me think..." Finally, they order and the bartender makes their drink. When the bartender asks for payment, the person looks in his/her purse for her wallet, rifles through it for the cash and then figures out what bill combination to pay with. As the transaction concludes, you see the bartender roll his eyes. It will be a long time before this patron gets served another drink.

An aerospace manufacturing company, with approximately \$100 million in sales, teeters on the brink of disaster. The credit line is stretched to the max, they borrow every day up to the limit, they are months behind on critical deliveries to some very unhappy customers, their vendors are demanding payment and threatening not to ship, the machines are running at full capacity yet shipments are being missed, the customers are canceling orders to place them with the company's competitors, there is way too much inventory and the employees are looking for new jobs. Their industry is booming, but this company won't see any of that increased demand for its products. No one can figure out why the company is in such bad shape, because the products, individually, are very profitable.

To most people, the above situations have nothing in common. But to anyone trained in "lean" philosophies, the common thread is clear: Setup times.

At Toyota (the grandfather of lean manufacturing), waste is a sin, and that includes any kind of waste — including overproduction.

Setups, a.k.a. changeovers, are one of the primary banes of any process, especially manufacturing. This is not because the setups themselves are unnecessary or inefficient, but the way traditional American manufacturers view and deal with the setups is inherently unhealthy and unprofitable. Anyone with a basic knowledge of economics can figure out that the per-unit cost of any fixed cost is lower as it is spread over a larger number of units. Since the objective in business is to keep costs low, there is an inherent drive to "amortize" the setup over as many units as possible even if that means keeping lots of inventory for (hopefully) future orders.

The above quest for efficiency in "amortizing" setups is exactly what caused the destruction of the aerospace company's business. Because their setup times were so long, and often a cause of scrap, the company would produce up to six month's inventory of a low-volume part in order to maximize their run efficiency. And for that product, they did! Unfortunately, while their machines were busy producing parts that wouldn't sell for another two seasons, they were not busy producing a part that was needed for shipment the next day. But it wasn't their fault really, because the setup times were pretty much fixed, so they were doing the best they could.

Or were they?

At Toyota (the grandfather of lean manufacturing), waste is a sin, and that includes any kind of waste — including overproduction. So would the answer be produce only the number needed for the next order, and then fall even further behind next month when another lengthy setup is needed to produce the same part just produced? Toyota's answer would be "Yes... Except eliminate the word 'lengthy' from the setup description."

It is precisely on how that last point is viewed which determines whether a company will become the world's largest automaker (Toyota) or be bashed to pieces upon the rocks of phantom inefficiencies (the aerospace company). At the aerospace company, management dismissed the idea that their setups could be improved much — because if they could, they would have already done it! The setups were as good as they would get. Look elsewhere for the solution, more machines, more capacity, etc.

Those versed in lean manufacturing would have responded differently. Instead of viewing themselves as helpless victims of their setup process — like the aerospace company — they would have focused like a laser on cutting down the setup times. And not by just a few minutes here or there — drastically. The approach used by Toyota in reducing setup times is called SMED, short for Single Minute Exchange of Dies. The key words here are single minute. Toyota isn't interested in reducing a two-hour setup time down to one hour — they want one minute. And it is the intense discipline and scientific approach that Toyota pioneered in reducing setup times, which allows the entire Toyota Production System to function. Without it, Toyota would be no better off than the aerospace company. Because lean manufacturers view themselves as the owner of the setup process, and not a victim of it, they empower themselves to do something about it.

Now, to come full circle: setup times for the bar scene? Out of all of the steps that the customer did while the bartender was waiting on her decision and for payment, handing over the cash was the only step that had to be done while the bartender was waiting for it. The solution here should be obvious — have your mind made up on your drink before the bartender asks, and while he is busy making your drink, get your cash in hand. This is why bartenders are trained, when the bar gets crowded, to look for and serve first the customers who have their cash visible. For the aerospace company, refocusing efforts to drastically cut the setup times would produce results tenfold over their current focus of dealing with the symptoms. It might not be free — though most of the SMED techniques are — but a few hundred thousand dollars spent to revolutionize their setup processes and thereby save the company would be a bargain compared to the costs of a Chapter 11 filing. [abfj](http://abfj.com)

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