

MURA, MURI, MUDA?

Womack, Jim

7/6/2006

Twenty years ago this month, when my first daughter was born, the young men I supervised in MIT's International Motor Vehicle Program went dashing out of the office to buy her a gift. They returned shortly with a pink T-shirt, size 1, with the stenciled message on the front "Muda, Mura, Muri."

My wife was bewildered – "Is this how guys welcome a baby girl?!" But I could understand. We had made an intense effort that summer to understand these new Japanese terms for waste (muda), unevenness in operations (mura), and overburdening of people and equipment (muri) that entered our lives when John Krafcik joined our team from NUMMI, the Toyota/GM joint venture in California. The boys just wanted to share their enthusiasm and took the first opportunity at hand.

Our understanding at that time was that "muda, mura, muri" was a logical improvement sequence for lean thinkers.

We suggested starting with muda, which is simply any activity that is waste because it doesn't add value for the consumer but does consume resources. Conveniently, Taiichi Ohno at Toyota had long before provided a list of the seven types of muda that was an excellent guide for action. So we urged managers to immediately tackle overproduction (ahead of what the next customer needs) plus unnecessary waiting, conveyance, processing, inventory, motion, and correction.

An additional virtue of starting with muda was that many types could be removed from a narrow area without the need to coordinate with the larger organization or across firms. For example, machines could be moved together quickly in a kaizen exercise to create a cell -- to eliminate the muda of waiting, conveyance, inventory, and motion. And this could be done without disturbing (or getting the permission of) the broader production system. We believed that the progressive elimination of muda would pave the way for tackling mura and muri.

That was the theory. But now, 20 years later, it's striking to me how much effort we've expended on eliminating muda and how little attention we have given to mura and muri. As a case in point, the American car companies have just announced new incentive schemes that will sell a large number of vehicles over a brief period, running down excessive inventories. This will lead to additional overproduction at the factories, which will lead to more inventories, which will lead to more incentives, which will lead to...

Meanwhile this unevenness in sales and production that is quite unrelated to any desires being expressed by customers (a common type of mura) -- will undercut the efforts of the entire organization -- from sales to purchasing -- to eliminate muda (waste).

And in most companies we still see the mura of trying to "make the numbers" at the end of reporting periods. (Which are themselves completely arbitrary batches of time.) This causes sales to write too many orders toward the end of the period and production managers to go too fast in trying to fill them, leaving undone the routine tasks necessary to sustain long-term performance. This wave of orders -- causing equipment and employees to work too hard as the finish line approaches -- creates the "overburden" of muri. This in turn leads to downtime, mistakes, and backflows -- the muda of waiting, correction, and conveyance. *The inevitable result is that mura creates muri that undercuts previous efforts to eliminate muda.*

In short, mura and muri are now the root causes of muda in many organizations. Even worse they put muda back that managers and operations teams have already eliminated once.

So I would give some different advice to the boys at MIT if they were preparing that T-shirt today. I would tell them to have it read "Mura, muri, muda." (Although the mother wouldn't be any less bewildered.) And I have the same advice for managers -- especially senior managers -- trying to create lean businesses:

Take a careful look at your mura and your muri as you start to tackle your muda. Ask why there should be any more variation in your activities than called for by customer behavior. Then ask how the remaining, real variation in customer demand can be smoothed internally to stabilize your operations. Finally ask how overburdens on your equipment and people -- from whatever cause -- can be steadily eliminated.

This will be hard work and will require courage because it will often require you to rethink longstanding sales, management, and accounting practices that create the mura and muri. However, if you can eliminate mura and muri at the outset to create a stable environment for your sales, operations, and supply management teams, you will discover that muda can be removed much faster. And once removed it will stay removed.

Best regards,

Jim

Jim Womack

Chairman and CEO

Lean Enterprise Institute (LEI)

P.S. Two good ways to eliminate mura and muri are to read Art Smalley's *Creating Level Pull* and Ian Glenday's *Breaking Through to Flow*.

Art concentrates on discrete parts manufacturing and shows how to introduce heijunka (demand leveling) with a carefully calculated standard inventory at the downstream end of facilities in order to remove mura and muri from the plant.

Ian focuses on batch processing industries, showing how to stabilize operations so that mura, muri, and muda can all be reduced.

And, if you are still struggling with key lean terms (which I confess that I still get wrong at times, even after all these years), get a copy of the *Lean Lexicon*, Second Edition. (Or get the new Third Edition when it is available in September.) I've had mine beside me while penning this note to make sure I haven't said "mura" when I mean "muri"!