

Industrial Excellence in China

Lean Manufacturing, a Giant with Feet of Clay by Bruno Lhopiteau

This article is our second in the series on Industrial Excellence in China. Bruno Lhopiteau is the General Manager of Siveco China, the country's largest maintenance consultancy. Bruno first came to China in 1998, for a paper mill project in Suzhou, and has lived here ever since. He is currently based in Shanghai. He can be reached at bruno.lhopiteau@sivecochina.com.

Introduction: The Magic of Lean

Lean Manufacturing is often seen as a silver bullet. Carried out with religious zeal, its tools will magically solve every problem a factory may have. A general manager in the Suzhou area once told me that obtaining a TPM Award for his plant was his only goal; anything else was just a waste of time, a distraction. This expat was obviously on an upward career path and has already left China.

A Lean production system, with all its benefits, also puts enormous pressure on equipment reliability, a major weakness at most plants in China. One problem is that equipment maintenance is as boring and old-fashioned as Lean is exciting and trendy (did I mention overhyped?)...

The first article in this series (see "Improving plant maintenance" in last month's newsletter) exposed the context of "maintenance with Chinese characteristics". This month, one of the key points I will make is the necessity to implement some engineering fundamentals before launching a Lean initiative.

What is Lean Manufacturing?

Who hasn't read "The Machine That Changed the World"? Industrial managers have all been exposed to Lean Manufacturing and have learnt a few Japanese words in the process, but in the last couple of years an unbelievable amount of hype has blurred our understanding of this management philosophy derived from the Toyota Production System (TPS). TPS focuses on reducing of the seven types of wastes to improve production, with such key concepts such as Just-in-Time, SMED (quick production changeover) and the practice of autonomous maintenance by production operators.

Most Lean practitioners nowadays seem to focus exclusively on flow optimization, value stream mapping, 5S and standardized work. The so-called "Jidoka" (machine design for quality and the separation of worker and machine) is much less popular, perhaps because it involves actual engineering know-how that few consultants have... relying instead on buzz words and increasingly complex pillars charts, to the point that it has become very easy to identify a good Lean specialist, one who speaks in a plain language and shows interest in your machinery and the work of your engineers.

Few people still remembers that we used to talk about TPM (Total Productive Maintenance) for what is today described as Lean: if machine uptime is not predictable, process capability not sustained, the process must keep extra stocks to buffer against uncertainty and the production flow will be interrupted. Plant maintenance is the foundation of Lean!

Lean Manufacturing and the Role of Equipment Maintenance

Don't take my word for it. After all, I am a maintenance engineer and not a Lean consultant! Below are excerpts of an interview with Tomo Harada, who spent 35 years in Toyota and worked at the famous Komigo engine plant under TPS pioneer Taiichi Ohno in the 60s (the full interview is available online at www.sivecochina.com): credentials than most Lean experts could only dream of. All quotes below are from Mr. Harada.

First, the forgotten truth:

"Equipment maintenance is one of the hidden strengths of Toyota but it does not get a lot of attention. However try to run a pull system or achieve standardized work if the machine is breaking down and kicking out bad parts all day long...you won't get very far."

Then something industrial managers in China will most likely recognize:

"When I started at Kamigo engine plant we imported virtually every machine tool from the U.S. or Germany. It was tough to make contact with the equipment vendors, order spare parts, get technical information, or even read the documentation etc. for trouble shooting. We were forced to take things apart by ourselves make sketches and make copies or improvements ourselves. Over time we ordered replacement machines from our internal machine tool company Toyoda Machine Works. Initially the replacement machines were all just basic copies of the foreign machines and we in maintenance and engineering had to give them detailed specifications on how to make key parts of the machines especially jigs, fixtures, clamping devices, locating pads, datum points, etc. It is part of our culture to do this probably more so than in the United States. You learn a lot though by disassembly, sketching, and making small improvements. Over two decades we came to build much of our equipment at Toyota affiliated companies and now it is even export it to the world as well."

Now some of the basics, which happen to be weak points at most Chinese factories:

"First we recognize the notion of equipment life cycle curve. Second we spend a lot of time training and developing skilled trades people in maintenance. Third we are very good at basic data collection and trend analysis. Fourth we plan and execute maintenance work very efficiently. Fifth we are very diligent about maintaining all the documentation we need for trouble shooting and analysis. Lastly as I said we practice kaizen in maintenance organization as well, we problem-solve the top five machines every week and every month."

Conclusion: Prerequisites for Lean Manufacturing

Some of you will remember the story of the king of Babylon, distressed by his dream of a splendid and awesome statue whose head was made of fine gold, its chest and arms of silver, its belly and thighs of bronze, its legs of iron, its feet partly of iron and partly of clay. A stone was thrown to its feet and the iron, the clay, the bronze, the silver and the gold were crushed together on the floor; the wind carried them away so that no trace of them was found...

This is what has happened to too many Lean projects in China. They failed, or failed to capture the potential benefits, as they ignored the necessary foundation. Good maintenance practice may perhaps be considered a given in western factories, it is however far from being the case in China, where the fundamentals are seldom in place. Tomo Harada's experience at Toyota provides strong guidelines, with all the necessary Lean credentials, which I combined with my own knowledge of the typical shop-floor situation in China:

- Do not rely exclusively on the more popular Lean tools for flow and value optimization, while ignoring plant engineering. Remember that TPM is the foundation of Lean and the M stands for Maintenance.
- Maintenance workers are already undervalued in China; do not further alienate them with the Lean project. On the contrary, implement the necessary training and tools so that, when a Lean process is finally in place, they can perform plant improvement projects.
- Reduce the breakdown rate (if the plant is still young and relatively breakdown-free, still ensure that your maintenance process is really under control), before implementing autonomous maintenance, through preventive maintenance activities.
- Implement systematic work feedback and analysis, in order to build up the maintenance know-how and support continuous improvement decisions. This systematic approach will anyway be needed to reduce the breakdown rate.
- When selecting Lean consultants, eliminate those who only speak in lingo, show undecipherable "pillars" slides and have the remaining few meet your technical staff and inspect the machines on the shop floor.

