



## **Lean manufacturing:** **The practical approach to productivity**

A lean manufacturing initiative focuses on cost reduction and increases in turnover by systematically and continuously eliminating non-value-added activities. In today's competitive market, lean is turning out to be "the solution" to manufacturing industries across the spectrum for survival and success.

Lean manufacturing helps organizations to achieve targeted productivity and more by introduction of easy-to-apply and maintainable techniques and tools. Its focus on waste reduction and elimination enables it to be engrained into organization culture and turns every process into a profit center. Thousands of companies worldwide have achieved tremendous productivity and return on investments by implementing lean practices and techniques. India has witnessed many success stories in its automotive, process and other industries.

In a nutshell, lean manufacturing is all about driving toward achieving profitability and productivity through continuous improvement and resource waste elimination. It is an organizational culture as well as specific practices with clear goals.

The road map to lean manufacturing and its benefits were discussed at a recent seminar hosted by Bangalore, India-based Axcend Automation & Software, a manufacturing IT solutions company. Senior-level delegates from various multinational and national

companies pitched in with their perspective on lean during this half-day event.

In today's competitive world, while large-scale companies have taken the first steps to implement lean in their organizations, small and medium establishments (SMEs) also need to follow the lean thinking and implement the same to achieve their set goals. S.D. Janakiram, lean advisor for public-sector enterprise HAL, set the theme for the event, mentioning that the company has embraced "Sampoorna Paravartan" (complete change) to implement lean. He reiterated the fact that implementing lean is a collective achievement, where every single member's dedication and perseverance makes it a success. Lean is about achievement orientation and execution excellence. There is a need for shift in thinking to "a zero tolerance for waste". Persistence for improvement, learning by doing, attitudinal changes and teamwork, along with emphasis to bring value quickly and remove waste continuously, form the essence of lean.

Mr. Janakiram concluded by saying that the mantra for success has four Ps – Purpose & Process as intellectual issues connected to the brain and Pride & Passion gives the heart dimension.

While lean is to be definitely achieved, how can it be done? What are the tools required? Providing answers to this was Gary Flum, the general manager for advanced manufacturing systems at QAD. Taking into account QAD's longstanding relationship with manufacturing industry, Flum gave the enterprise IT perspective of achieving lean. He presented the lean solution

available from QAD that could be implemented even in SMEs. He started off with the evolution of the automotive industry, mentioning that the dichotomy of successful manufacturing is cost and innovation. Plotting a curve of value associated with phases of innovation, Flum mentioned that the challenge is to keep the value derived through innovation growing; continuous innovation allows you to stay ahead of the cycle of common acceptance.

Flum went on to present how overhead costs in an enterprise were directly reduced due to implementation of lean. He concluded by mentioning that lean manufacturing focuses on the value stream and by showing the advantages of implementing lean and just-in-time in manufacturing.

Lean is a generic process management philosophy derived mostly from the Toyota Production System (TPS), hence it was definitely relevant for Toyota to speak on this. T.R. Parasuraman, general manager of Toyota Kirloskar Auto Parts (TKAP) spoke about best practices of manufacturing and its benefits. Elimination of three Ms – muri, mura and Muda – is important and forms the basis of TPS. Touching upon the 5-S methods, Parasuraman reiterated the need to passionately practice it to achieve global standards. If quality is lost, everything is lost. Emphasis on quality is supreme and any failure needs to be analyzed in depth to get the root cause.

“Rejection is a treasure” said Parasuraman, reiterating the Toyota way of handling quality problems. He concluded by offering his Ten Commandments of Quality.

Overall, the delegates were enabled with the seminar’s objective for inducing and practicing lean thinking. Today, it is relevant that any organization that has set its goal to be a global player or a regional leader has to incorporate changes to be productive and competitive. Lean manufacturing shows the way to that goal.

## PLAN-DO-CHECK-ACT (PDCA) CYCLE

Also called: PDCA, plan–do–study–act (PDSA) cycle, Deming cycle, Shewhart cycle

The plan–do–check–act cycle (Figure 1) is a four–step model for carrying out change. Just as a circle has no end, the PDCA cycle should be repeated again and again for continuous improvement.



Figure 1: Plan-do-check-act cycle

### When to Use Plan–Do–Check–Act

- As a model for continuous improvement.
- When starting a new improvement project.
- When developing a new or improved design of a process, product or service.
- When defining a repetitive work process.
- When planning data collection and analysis in order to verify and prioritize problems or root causes.
- When implementing any change.

### Plan–Do–Check–Act Procedure

1. Plan. Recognize an opportunity and plan a change.
2. Do. Test the change. Carry out a small-scale study.
3. Check. Review the test, analyze the results and identify what you’ve learned.
4. Act. Take action based on what you learned in the study step: If the change did not work, go through the cycle again with a different plan. If you were successful, incorporate what you learned from the test into wider changes. Use what you learned to plan

new improvements, beginning the cycle again.

### Plan–Do–Check–Act Example

The Pearl River, NY School District, a 2001 recipient of the Malcolm Baldrige National Quality Award, uses the PDCA cycle as a model for defining most of their work processes, from the boardroom to the classroom.

PDCA is the basic structure for the district’s overall strategic planning, needs–analysis, curriculum design and delivery, staff goal-setting and evaluation, provision of student services and support services, and classroom instruction.

Figure 2 shows their “A+ Approach to Classroom Success.” This is a continuous cycle of designing curriculum and delivering classroom instruction. Improvement is not a separate activity: It is built into the work process.

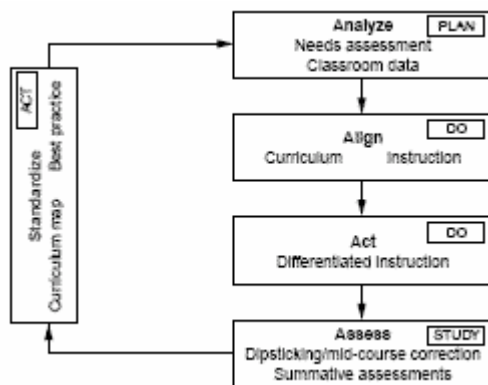


Fig. 2: Plan–do–check–act example

**Plan.** The A+ Approach begins with a “plan” step called “analyze.” In this step, students’ needs are analyzed by examining a range of data available in Pearl River’s electronic data “warehouse,” from grades to performance on standardized tests. Data can be analyzed for individual students or stratified by grade, gender or any other subgroup. Because PDCA does not specify how to analyze data, a separate data analysis process (Figure 3) is used here as well as in other processes throughout the organization.

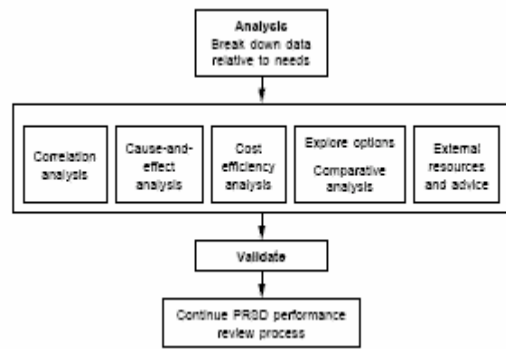


Fig. 3: Pearl River: analysis process

**Do.** The A+ Approach continues with two “do” steps:

1. “Align” asks what national and state standards require and how they will be assessed. Teaching staff also plans curriculum by looking at what is taught at earlier and later grade levels and in other disciplines to assure a clear continuity of instruction throughout the student’s schooling. Teachers develop individual goals to improve their instruction where the “analyze” step showed any gaps.
2. The second “do” step is, in this example, called “act.” This is where instruction is actually provided, following the curriculum and teaching goals. Within set parameters, teachers vary the delivery of instruction based on each student’s learning rates and styles and varying teaching methods.

**Check.** The “check” step is called “assess” in this example. Formal and informal assessments take place continually, from daily teacher “dipstick” assessments to every-six-weeks progress reports to annual standardized tests. Teachers also can access comparative data on the electronic database to identify trends. High-need students are monitored by a special child study team.

Throughout the school year, if assessments show students are not learning as expected, mid-course corrections are made such as re-instruction, changing teaching methods

and more direct teacher mentoring. Assessment data become input for the next step in the cycle.

**Act.** In this example the “act” step is called “standardize.” When goals are met, the curriculum design and teaching methods are considered standardized. Teachers share best practices in formal and informal settings. Results from this cycle become input for the “analyze” phase of the next A+ cycle.

*Excerpted [The Quality Toolbox](#), Second Edition, ASQ Quality Press, 2004.*

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## Gemba Walk Genchi Genbutsu

The genchi genbutsu principle involves going to the gemba every now and then so as to understand the situation on the ground. You go to gemba with a specific list of things in mind that have to be in place. Using a gemba walk checklist, you verify that the necessary conditions are in place for the smooth running of operations.

Leaders should go to gemba with this checklist on a regular basis so as to gain a clear understanding of the real conditions. This will make them better placed to make the right decisions that will have a positive impact.

### What is Genchi Genbutsu?

Going to the gemba is a kaizen practice of always going to the source of the problem so as to grasp the real issues and verify facts. When a problem that has an impact on the operations of a company occurs, many people will try to get answers using data without first verifying it at the actual point that it is occurring. "Go to Gemba" is a problem solving paradigm in lean thinking that encourages first hand observation at the point where a problem is happening. Confirming data in this way is important because most of the time the data is subjective and needs to be put into context through observation.

### Origin of Genchi Genbutsu

The concept of "going to gemba" was started at Toyota by Taiichi Ohno who is credited for the Toyota Production System. Taiichi Ohno was known for asking new management trainees to stand at one spot on the factory floor and observe everything that took place for a whole day. This instilled the discipline of careful observation which can lead to very meaningful insights.

### Benefits of Going to Gemba

Taiichi Ohno, as a manager at Toyota, developed rules and principles for handling problematic situations in the shop floor. The five steps to take when a problem occurs are:

- **Go to the gemba** where the real work is done and observe the source of the problem
- **Check genbutsu** which are all the equipment and resources in the gemba
- **Take temporary countermeasures** on the spot so as to ensure operations are not disrupted
- **Find root cause** of the problem by asking why the problem occurred in the first place
- **Standardize** any resultant procedures to prevent recurrence of the problem in the future

The benefits of this kind of thinking are:

- Easy to confirm reports on the ground rather than relying on reports which may be subjective and not realistic
- One gains deeper understanding of the situation by doing a comprehensive root cause analysis at the place where the problem is located
- Other issues that might not been captured by the reports become apparent as one is observing the intricate relationships of processes at the source