CASE STUDY – KAIZEN BLITZ – Unleashing the Storm of Empowerment

A growing number of companies are discovering that highly focused "kaizen events" can be a great way to unleash employee creativity and upgrade manufacturing operations--in a hurry.

By Joseph Turnbull

In a good year, the U.S. manufacturing sector might chalk up a 4% overall increase in productivity. At the plant level, some top-flight production operations have achieved gains of 20% or more in a 12-month period. But you’d be hard-pressed to find anyone with a more impressive productivity story than Dino Clark in Building 102 of AlliedSignal Inc.’s jet-engine manufacturing complex on the south side of Phoenix.

Kaizen Case Studies

Caterpillar Logistics: Adapting kaizen activities to a warehouse

Clark, a veteran machinist, is one of six multi-skilled production workers who operate a nine-station manufacturing cell that produces fan discs, a critical jet-engine component featuring highly contoured grooves. In the last year, the productivity of that operation has soared by 885%.

That’s not a misprint. The increase was 885%. Before," says Clark, "we were lucky to get out one part per day. Now, we’re getting 10 out in a day--and we’re doing it with fewer people."

On display near the cell, is a "spaghetti chart" depicting the circuitous 2,686-ft route that parts once travelled through the plant, not including trips outside the building for special processing? Now, the travel distance is just 667 ft, through a simple loop, and outside processing has been eliminated. "We’re now doing one-piece flow," Clark says. One result: work in process (WIP) in the cell has been slashed by 89% and cycle time by 79%.

AlliedSignal Aerospace: Anatomy of a kaizen event.

“At the business-unit level, our productivity goal is a 6% improvement each year—and we’ve been exceeding that. At the factory level, it has been much higher. Most of our buildings are getting about 20% year-to-year productivity improvement.”

One advantage of squeezing all the activity into a single week, says Joseph Turnbull, founder and Managing Director of Worldwide Business Solutions, is that "it doesn’t give you the luxury to think of big, expensive solutions.

The emphasis is on solutions you can implement quickly. And you get immediate reinforcement by getting results."

Guru’s View of the Gemba

What caused the quantum leap in performance?

The short answer is kaizen--the Japanese term for continuous-improvement activity. However, that’s really only half the answer. In its traditional context, kaizen means making small, incremental improvements over an extended period. In recent years, however, a growing number of manufacturers in the U.S. and Europe and around the world have been catching on to a methodology that accelerates the kaizen process and produces dramatic results in a week or less.

“The goal of a kaizen breakthrough event is not to create a perfect production line. The goal is simply to create a better production line.”

More commonly referred to as "kaizen events" or "kaizen workshops," the approach targets a particular manufacturing cell or other segment of the production chain. Typically, the participants are a cross-functional team including managers, engineers, support staff, maintenance workers, and production operators--sometimes supplemented by marketing or finance personnel, and even people from outside the company. The team generally spends five days in the target area, studying the process, collecting and analysing data, discussing improvement options, and implementing changes--which may involve moving or modifying equipment.

The five-day kaizen event (some companies do it in two or three) is a quick-hitting way to get results. Experienced practitioners, however, point out that the job is never finished. That’s why many companies that have adopted kaizen techniques deploy them repeatedly--often revisiting the same target area.

A Plant Solution

One explanation for the recent surge in interest: Although most manufacturing executives now have a fairly good grasp of the principles of the Toyota Production System--the basic framework of "lean" manufacturing--many have been looking for a way to introduce the concepts into their plants. In addition, that’s just what kaizen events originally were designed to do.

In his book, Gemba Kaizen: The Common-Sense Approach to Business Management (1997, McGraw-Hill), Masaaki Imai, founder and chairman of the Kaizen Institute,
points out that after Toyota Motor Corp. had developed and implemented just-in-time (JIT) production methods within its own facilities, company executive Taiichi Ohno formed an autonomous study group to spread the practices to the automaker’s suppliers. "Each month," Imai notes, "the group visited a gemba [workplace] of a different supplier and conducted gemba kaizen there for three or four days... [This] proved to be such an effective way of spreading Toyota’s JIT know-how and practices among its suppliers that the primary suppliers soon began involving their second-tier suppliers in the activities as well."

Robert W. Hall, professor of operations management at Indiana University and a long-time AME official, recalls that Toyota began conducting its kaizen blitzes with suppliers in the early 1970s. "When Toyota did it, it was more like a blitzkrieg--total war on waste," he says. While researching his 1983 book, Zero Inventories, Hall talked to one of the floor leaders at Tokai Rika, a Toyota supplier firm in Japan. "He told me that he went home only three nights during the five-month period while they were going through it. They went end to end and transformed the entire plant," Hall says.

Although today’s kaizen events may be somewhat less intense, team members often put in 12 to 14-hour days, and maintenance crews are frequently on call to work through the night—moving machinery and modifying equipment or electrical drops after other team members have left for the day. However, the effort does pay off.

With adequate preparation and strong management support, a series of kaizen events can produce a significant transformation.

Kaizen is more than just a tactical weapon. It is also a set of tools and a basis for building a competitive strategy. The kaizen toolbox includes the 5s of good housekeeping—derived from five Japanese words beginning with the letter "s"—along with standardization of procedures, and elimination of muda, the Japanese term for waste.

From a tactical perspective, "kaizen deals with breakthrough change, done swiftly, and adhering to the principles of the Toyota Production System. And, as a strategy, if your problem is disconnection—batch manufacturing and erratic demand inside your factory—then kaizen may be the perfect prescription."

The Five Ss

The 5S of good housekeeping is derived from five Japanese words that have been given English counterparts. Here is how they are defined by Masaaki Imai in Gemba Kaizen:
**Seiri (sort):** Separate out all the things that are unnecessary and eliminate them.

**Seiton (straighten):** Arrange the essential things in order so that they can be easily accessed.

**Seiso (scrub):** Keep machines and working environments clean.

**Seiketsu (systematize):** Make cleaning and checking a routine practice.

**Shitsuke (standardize):** Standardize the previous four steps to make the process one that never ends—and that can be improved upon.

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### Kaizen Blitz - Benefits

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**Steady Gains**

Many companies that have embraced the concept would agree. While the 885% productivity leap achieved in the AlliedSignal fan-disc cell may be an aberration, steady across-the-board gains are common. "At the business-unit level, our productivity goal is a 6% improvement each year—and we’ve been exceeding that," says Marc Hoffman, vice president—operations for the firm’s Phoenix-based jet-engine business. "At the factory level, it has been much higher. Most of our buildings are getting about a 20% year-to-year productivity improvement."
However, productivity isn’t the only benefit. At AlliedSignal, kaizen events have targeted improvements in quality, lead-time reduction, on-time delivery, and even improved cash flow. The 2,000-employee business unit now stages about 200 kaizen events a year, and occasionally conducts them for supplier firms.

Hoffman, who brought in TBM Consulting to help spread the kaizen gospel, says that the kaizen principles mesh very well with the aerospace unit’s overall business strategies--one of which is growth. "It fits very well," he says, "because it frees up resources and capacity to accommodate that growth."

In Building 102, where rotating-engine parts are produced, the results of the kaizen strategy are evident. Since early 1995, WIP inventory has been reduced by 42% (from $14.2 million to $8.3 million), the defect rate slashed 31%, and man-hours/part cut 32%. Meanwhile, the facility’s customer-satisfaction index has soared. Achieving those gains took a series of kaizen events and a good deal of effort. "Over the last two years, we’ve moved every machine in this building--about 300 machines," says George Kolb, manager of production systems, who heads AlliedSignal’s kaizen promotion office in Phoenix.

Kaizen activities require the support of hourly production workers, Hoffman points out. "On the Tuesday or Wednesday after a kaizen event, people have to continue to do things the new way. And that is often a struggle, because change is uncomfortable."

Companies that have climbed on the kaizen bandwagon have found ways to institutionalise the changes made. For example:

Standard Products Co., a $1.2 billion automotive-components manufacturer headquartered in Dearborn, Mich., has introduced kaizen events at all 39 of its plants worldwide. "We’ve gotten productivity improvements of 25% to 30% in each workshop, and typically we’ve reduced WIP by 80% or 85%," says Mark Griffin, corporate director of continuous improvement and quality assurance.

Working with the Kaizen Institute, Standard Products initially conducted five-day events, devoting the first day to training team members in the basic principles. "But we’re doing them a little faster now," Griffin says. "We’ve been through [the training] with a lot of our workforce, so now it is not uncommon for us to go right to work and do them in three days."

In fact, CEO Ted Zampetis has instigated an even faster version, one-day events, which he calls "lightning kaizens." When Zampetis goes on plant tours with manufacturing staffers, Griffin notes, "he’ll send people back to get stop watches and time the activities in an area, and make changes the same day."
Standard Products’ workshops often focus on achieving one-piece flow through takt time analysis and work balancing. "If your takt time is 30 seconds," Griffin points out, "then every 30 seconds a [finished] part should be going into a box."

Getting to a smooth one-piece flow, Griffin explains, often requires detection of inefficient worker movement, which can be obscured in a traditional plant. "If you are producing in batches, a guy can look busier than the dickens, but what you don’t see is that he was in the john for 25 minutes. In other cases, people may be putting in unnecessary motions."

Black & Decker Corp.’s Household Products Div. began staging kaizen events at its Asheboro, N.C., plant in 1994, with assistance from Worldwide Business Solutions. It has since spread the practice to its plants in Queretaro, Mexico, and Kuantan, Malaysia, and has been doing "office kaizens" at division headquarters in Shelton, Conn. Last year 300 people participated in 42 kaizen projects at the Asheboro plant, which makes a variety of appliances such as toaster ovens and coffee makers, as well as the "Snakelite" flashlight. All told, those 42 projects yielded a 29% plant-wide productivity increase, a 74% reduction in WIP, a 39% reduction in floor space, and total savings of $4.6 million.

In the Snakelite area, one kaizen sub team studied takt time utilization and experimented with work rebalancing. It implemented changes that improved worker productivity by 36%, while freeing up 1,800 sq ft of floor space. A second sub team built a simulated U-cell that achieved 52% higher productivity than the main production line.

"Previously, we’d been involved with implementing demand-flow technology, which puts a lot of emphasis on analysing the situation and studying it for six months. But kaizen is much more a hands-on, ‘let’s go do it’ approach," says Dennis Harrison, division vice president-quality. "We have a tendency in the U.S. to not want to move until we have all the answers. But if you study something too long, it never gets done."

Pella Corp., a manufacturer of window systems based in Pella, Iowa, launched its kaizen event program in December 1992. "We call them PIEs, or process-improvement events," says Mel Haught, senior vice president of operations. "We started doing them on the shop floor, but we have since deployed the discipline in a number of other areas. We created a spin-off effort for rapid quality improvement, and we are expanding into the administrative area."

Pella has conducted 762 events--about half lasting five days and the others ranging from two to four days. As for the cumulative impact, Haught estimates the firm’s overall productivity has increased by 40% to 45% since 1993--"and we are still delivering an 8%-to-10% improvement per year." Other improvements since 1993 include: a 60% reduction in order-to-shipment lead-time and an overall WIP reduction of 50%. 
"It’s not due entirely to the kaizens, but that has been an important tool," Haught says. "A lot of it comes about because of what the [kaizen program] has released in terms of employee empowerment. We’ve had more than 2,600 people participate in the 762 team events.” Typically, about 40% of the team members are hourly production employees.

**Kaizen Blitz - The Event**

Companies have taken different approaches to assembling teams for kaizen events. When the activity is relatively new to a company, often there is a high level of senior-management participation to foster understanding of the principles and to build management support. As a company’s kaizen program matures, it may shift to smaller teams composed primarily of production workers.

Typically, when the target area is a specific manufacturing cell, several hourly employees in the cell are tapped to join the kaizen team, while their co-workers continue to do their normal jobs. "The team members need to observe the line during normal

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production, so you need a running line," explains Black & Decker’s Harrison. "The people on the kaizen team don’t do any actual production work during the event."

It is important to include hourly workers as team members, he adds, because "they know the operation. They can help the team to understand why things are done a certain way."

However, it is equally important, in many cases, to include people unfamiliar with the operation--such as salesmen, secretaries, or company outsiders--because they are more likely to question why things are done a certain way. Joseph Turnbull of WBS notes that salesmen and outsiders are more likely to ask the tough questions. By challenging accepted practices, they often trigger critical analysis of an operation.

The ideal team, Schwartz suggests, might include: three to five production operators, a supervisor, a quality expert, a manufacturing engineer, two or three management people, and possibly a cost accountant or a salesman. "A cross-functional, diagonal slice of the organization usually gives you the best team," he says. "You’re more likely to get a lot of good ideas that way."

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**Kaizen Blitz - Objectives**

*Kaizen Blitz is... The rapid IMPLEMENTATION of Lean Manufacturing in short period of time*

**KAIZEN BLITZ IS**

**NOT... A training workshop**
Preparation

While a kaizen event takes place within the span of one week, the advance preparation may take much longer. The first step is to identify target areas where improvements will have a significant competitive impact. It’s also important to analyse the physical layout to determine what equipment would be difficult to relocate.

"A kaizen mandate should be prepared before every event." "The mandate narrows the boundaries--for example, changing the production scheduling system or the choice of materials may be out of bounds. The mandate also should identify the objectives that you are trying to achieve.

"It is easy to have eyes that are bigger than your stomach when you are doing a kaizen event. However, you have to be realistic about what you can accomplish in five days. That’s why you string a bunch of events together--because you can never fix everything all at once."

"The scope of an event is awfully important," concurs Pella’s Haught. "You don’t want to bite off more than you can chew--or you run the risk of frustrating the team." At Pella each weeklong event winds up with a Friday morning meeting--often attended by senior management--at which the team members report on their efforts. In terms of sustaining enthusiasm for continuous improvement, Haught says, "there is a lot to be gained in those Friday sessions," especially when teams are able to report significant successes.

In organizations where kaizen activity is a relatively new phenomenon, training of team members--usually done on the first day--is an important aspect of the preparation. "The training sessions aren’t intended to make people kaizen experts in a single day," says Harrison at Black & Decker. "But you explain the goals, you explain how to collect data, and how to begin to implement change."
Kaizen Blitz - The Event

‘Before’ Layout

- The layout team did line diagram analysis to see the current flow of parts
- Redesigned for a continuous flow prod’n
- FIFO used where flow was interrupted
- Cell sets its own priorities
- ‘Skates’ made for stillages - to push around the cell
- No forklifts req’d

‘After’ Layout

- Planning & Control
- Inbound Logistics
- Value Stream Mapping
- Set-up Reduction
- Housekeeping
- Cell Design
- Set-Up Time & Takt
- Blitz Approach Simulation game

Day 1 - Core Skills Training

- Day 2 - Application of Core Skills

- FIFO
- GF1
- GF28
- DR
- SKIVE
- WELD
- TEST
- BENCH
- Long drill
- Short drill
- Weld
- Skive
- Test
- GF28
- GF1
- Long drill
- Tos lathe
- TOS
- Layout
- JDP
For More Information Please Contact: Joseph Turnbull

Worldwide Business Solutions: www.wwbsgroup.com

The London Office
31, Candover Close
Harmondsworth
Middlesex, UB7 0BD
Tel: +44 (0) 208 7599631
Fax: +44 (0) 208 7599632
turnbull.j@wwbsgroup.com