



CASE STUDY

Normally Kaizen is used as a method for moving an organisation towards a philosophy of continuous improvement. With this manufacturer it was used to provide rapid, innovative change with the maximum employee buy-in to support consolidation to a single site manufacturing operation.

The Paradox - Using Continuous Improvement Methods to make Step Changes

In 1997, a major manufacturer of doors and windows products had been experiencing significant reductions in sales volume. This led to over capacity at their two manufacturing sites. In order to address this they decided to consolidate their two operations, currently in separate factories, into one site. As well as site consolidation, the company wanted to complete the move in one year, with no impact on customer service and product quality.

As a first step they engaged WWBS Group to conduct a feasibility analysis for the consolidation. The analysis showed that a number of linked initiatives would be required in order to make the move a success. They were:

- ◆ Re-Engineering the Master Planning and Scheduling Process to reduce lead time from x to y days and provide a stable production schedule
- ◆ Outsourcing of non-core competency processes
- ◆ A 40% reduction in manufacturing space through the introduction of World Class Manufacturing techniques
- ◆ A 100% increase in inventory turns through improved scheduling, JIT relationships with major suppliers and the introduction of a Kanban based shop floor inventory control process

Three client led WWBS Group facilitated teams were formed and chartered to address the areas of Manufacturing, Purchasing and Planning & Scheduling. The Planning and Scheduling team undertook their task using a classic BPR methodology coupled with the WWBS Group consultant's in-depth knowledge of planning techniques to ensure a World Class solution. The Purchasing team focused on building more effective supplier relationships to support JIT deliveries to become the norm.

Although these areas required significant work, it was felt that the Manufacturing team faced the greatest challenge. How to halve the space required by designing and implementing World Class Manufacturing techniques, then move an entire production facility and the employees 45 miles while not impacting customer service or quality!



To reach these goals quickly and effectively, any approach had to satisfy the following drivers:

- ◆ Key people at all levels had to be trained in World Class Manufacturing methods
- ◆ The knowledge and skills of the entire organisation must be harnessed in the design of the consolidated site
- ◆ Buy-in throughout the organisation, that the move would be successful and attain the results for success, needed to be established rapidly

It was quickly realised that standard BPR or WCM techniques would either not address all the issues or be too slow to reach the goal of being moved in under one year. To further complicate matters, the improvements had to be designed and made during the company's peak production season. This would limit the number of resources available to engage in design and improvement activities.

WWBS Group, in conjunction with the client's own internal consultants, reworked the Toyota Production System's Kaizen Blitz methodology. By blending Kaizen, problem solving methods and purpose built WCM training, along with WWBS Group's unique manufacturing simulation, a Kaizen Event could be reworked to achieve layout designs in what were relatively complicated fabrication, sub-assembly and final assembly areas.

In the week before each event, a dedicated team of "Lean Facilitators" would map out the areas to be covered and calculate the space occupied. The WWBS Group event facilitator and the client's "Lean Engineer" would brainstorm the event focus, e.g. cell layout, improved output, reduced lead-time, set-up time reduction, etc. This would allow them to further tailor the training to meet the event needs.

The events were held over five days, finishing with a presentation of the proposed changes to the executives and managers. The twenty participants were drawn from every area and level in the organisation and outside suppliers was also invited to participate fully. For each event, a senior executive was nominated as both a fully participating team member and as a "Champion" for that area. This is done to ensure that people are aware of the leadership commitment to the process.



Day 1 - Child's Play

Starting with definitions of what a World Class business looks like and an overview of World Class manufacturing techniques, participants are rapidly brought to a common understanding of the direction to be taken.

WWBS Group's manufacturing simulation is based on assembling a product made out of "lego," a European children's toy. All supply chain functions are represented in the simulation and are fulfilled by the event members. The game consists of four rounds or quarters, with facilitated problem solving after each.

The simulation is set up to take the team through the normal phases of a World Class evolution and after each round they receive training in subjects like Shop Floor Layout Design, Cellular Manufacturing, One-Piece Flow, Kanban, Set Up Reduction and Quality.

Each of the training modules is related into the simulation and the actual processes on the shop floor. This allows team members to quickly relate the training to what happens in their own business. After the simulation is finished the base products are introduced to the group and a discussion is held to make sure that everyone understands why they have been selected.

A brainstorming session wraps up Day 1, using modified affinity diagrams led by the WWBS Group facilitator. This allows people not wholly familiar with the area to become acquainted with the types of problems and issues experienced there. The end of Day 1 arms all participants with the knowledge to start looking at the area from a World Class viewpoint.



Day 2 - Walking the Walk

The team is introduced to the Kaizen tool for layout - the Standard Work Sheet. They then break into their sub-teams and go out onto the shop floor to document the area for space, WIP part volume, parts travel distance and operator travel distance. These will be used as the starting values against which improvements will be measured. Having completed their first task, they reconvene and present their numbers to the other sub-teams.

After this the teams are led through collecting cycle times for all operations. Then they once again head for the floor to gather this data. Towards the end of Day 2 the teams come together to start preparing the Workload Balancing Sheet. Using the base products, the facilitator takes the group through Takt Time calculation and helps them prepare the chart. At this point any questionable cycle times are identified for further study.

Once completed, the chart is reviewed to identify actual and potential bottlenecks. This helps the team to focus on some of the areas that may need to be addressed for more capacity or productivity. It also supports the redistribution of work between operations to balance load evenly. This information is also used to prepare Standard Work Combination Sheets. These list the processes and cycle times in a graphic way which aids the user in identifying activities which may be combined, reduced or eliminated.



Day 3 - Building Castles in the Air

Now that the teams have all the data and knowledge, they are asked to design their "ideal" solution. This "ideal" assumes no physical barriers like walls, utilities, etc., and allows capital expenditure.

The reason no boundaries are set is to encourage the teams to think creatively or "out of the box." As the design progresses, the sub-teams come together and integrate their approaches. Meanwhile, new issues like new equipment purchases, changes to containers, modification of work benches, etc., are identified and listed. As the teams work on the design, the facilitator roams the sub-teams providing on the spot guidance and the occasional tip.

Once the facilitator feels that the design has gone as far as it can, they bring the group back together and review what they have achieved. Now that we have the "ideal" solution we introduce the physical barriers and ask the team to complete two tasks.

Firstly, they must redesign the area to accommodate the physical (and monetary barriers, if applicable) and secondly, design any new processes that will be required, e.g. a Kanban process or new set-up methods.



Day 4 - Making it Work

The penultimate day dawns and the pressure is now on the teams to produce the goods. As they 'fine tune' their solution, again supported by the facilitator, they are encouraged to run experiments. For example, they may recreate an area with tables and chairs to address material handling issues, or try assembling a product in a different way on the shop floor.

At this point they may also be able to make some real life changes. Before doing this, they must introduce the new process and layout to the area employees and get their agreement. After the change is made, someone is detailed to follow up and ensure that it is working. Towards the middle of the afternoon the team finalises their design and starts preparing for the presentation.

The changes are summarised into action lists and the starting values are compared against those in the solution with percentage improvements calculated. Once all the information is ready, a presenter is nominated for each sub team and they start to prepare their own area information ready for the final day. The team leader is responsible for pulling together the sub-team presentations and introducing and summarising the overall results.

In facilitating the presentation, the focus is on quality of content rather than appearance.



Day 5 - The Crunch

The final day arrives and the team must now apply the finishing touches to their one-hour presentation. The presentation is open to everyone in the organisation and it is not uncommon for 30 or 40 people to attend from all functions and levels. In order to demonstrate once again the leadership commitment, senior management are required to attend if they are on-site.

During the presentation the team outlines the areas they were studying and then takes the audience through the improvements made by the sub-teams and the actions necessary to achieve them. To round off the hour, the team leader takes the group through the new layout and processes and then summarises the results. Once this is complete they show where the area will fit in the consolidated facility and then the session is opened for questions from the floor. Once the questions have finished, there is a graduation ceremony at which all team members are presented with a certificate of completion and the "Ten Team Commandments." The senior executives present make the presentations. After the awards people are encouraged to mingle and ask further questions.

The Results

There are to be nine events held over two months, covering over 80% of the functional areas in the two factories. At the time of this article, six have been completed and the results are shown in Table 1.

	Event #					
	1	2	3	4	5	6
Space	22	41	34	28	49	31
Walking Distance	15	58	80	72	77	52
Parts Travel Distance	53	29	65	60	64	41
WIP	30	60	72	56	78	56



The impressive reductions in space and work in process inventory easily met and exceeded the requirements. However, the productivity and lead time improvements achieved through reducing walking and parts travel distance demonstrated the potential for further cost reductions.

One of the aspects people see as the most surprising is that even areas that had been set up as "lean manufacturing" cells still realised significant reductions in space, walking distance and WIP. The Area Manager of one such area said, "I would have thought we could have got maybe a 10 or 15% improvement, but 34%! And with an increase in productivity! And more output!"

One reason for this is that they were not set up using cross-functional facilitated teams but were designed off line and then "thrown over the wall" in the traditional style of process change introduction. As was learned and demonstrated during and after the events, when design involves as many of the people affected as possible and is outlined and agreed by everyone before implementation, then the change management process becomes much smoother.

So what happened to the actions and improvements identified when the events were completed? This is where the Lean Facilitators and Engineers would step in. Using the knowledge they gained during the events, they would lead, facilitate and co-ordinate the next steps using both the original event members and anyone else required to "get it done."

In order to accelerate this process, dedicated "Move Teams" are being formed using key individuals from the events and the "Lean Team." These Move Teams will own the action lists and have the accountability for planning and leading the move when it occurs. They will design and deliver the training for the operators in the new layouts and processes and be the focal point for all issues relating to move, start and ramp up.

This is extremely powerful in harnessing the momentum gained at the event and in utilising the knowledge that the event team members gained of World Class Manufacturing as relates to their areas.

Although success in getting the World Class message across relies a lot on the age old, "you can take a horse to water" concept, the team members are all continuing to demonstrate awareness and enthusiasm for the process. The most impressive result has been the ownership seen and heard among the hourly shop floor employees. A great example of this was seen when an hourly employee (who has started the week as a very disbelieving and cynical individual) went down to the shop floor and brought a friend



back up from the area to take them through the layout, showing it off while proudly telling of how it was solving so many problems in the area.

Many of the actions identified were grabbed and implemented by the people within days of the event's finish. During one such activity an operator, who was not even part of the event, came to the Area Manager and asked if he could change the layout of his area to improve the flow - the changes asked for were almost identical to those the team had identified!

More and more people are recognising the help the process offers. As one area starts to change, others ask when they will get the chance to learn and improve.

Due to the success of the events, once the consolidation has taken place and the processes have stabilised, ALL employees will go through a Kaizen event. These events will be focused on bringing everyone up to the same level of understanding and making further improvements in the World Class indicators of Quality, Lead Time, Flexibility and Waste Elimination.

The final endorsement was heard from an operator during an event, "We are learning and making things better as the event goes on. **This isn't work... this is fun!**"



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