



Jeffery Liker
Author of
The Toyota Way

Sanjeev,

*I read the case and was extremely impressed. It certainly followed all the principles that I talk about. Your vision and faith in the process, when you had not experienced it before, and leadership through very difficult times is admirable. Taking such dramatic steps into the unknown, when the viability of the company was at stake, and getting your people on board at each step, was also remarkable. **It is one of the top stories of total lean enterprise transformation** from sales to product development to manufacturing, to delivery that I know of.*

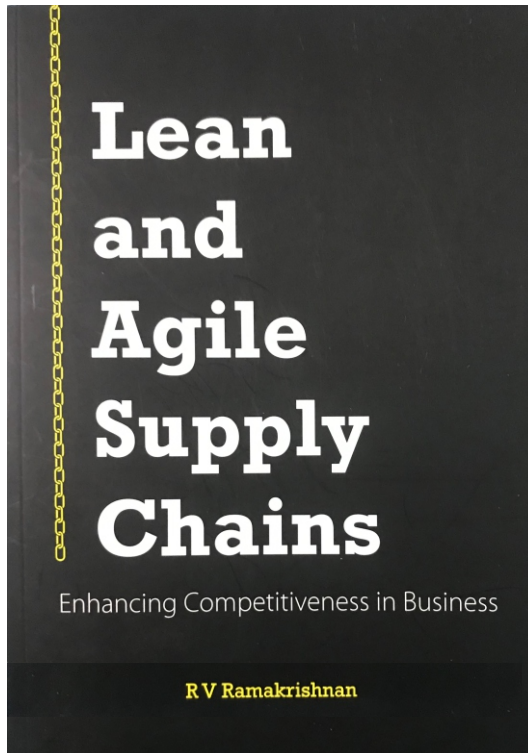
Best,
Jeffery Liker (Author of The Toyota Way)

On India's first full and comprehensive total Lean Enterprise Transformation story.

Case Study:

8 Lean-The Success Story

(Note: This is the real story of the successful journey in implementing Lean Manufacturing as narrated in the words of Mr Sanjeev Baitmangalkar, the then Unit Head of Mysore Kirloskar Ltd., who was instrumental in executing the turnaround strategy from a traditional manufacturing organization to a Lean enterprise).



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> INTRODUCTION

The case of Mysore Kirloskar Ltd. (MKL) Hubli factory is one of India's earliest Lean successes; a business that transformed from, a discrete batch Production push system to one of complete customer pull; a journey that began with the listening to Dr. Schonberger in early 1991. Taking bold, drastic yet realistic decisions that marked the most eventful journey, closing the error ridden forecasting dependant Production Planning and Control department and allowing the customers themselves to regulate the daily Production rate; boosting quality by closing the conventional Inspection department and empowering the operators to become responsible to control quality of their output was the beginning of installing the Jidoka thinking. Cutting down throughput times from what was between thirty to forty five days, to two to three and a half days, and, sharing the savings from cost reduction with our customers through a permanent downward price change to customers on various products of up to thirty percent, and delivering value to our customers beyond the comprehension of the competition.

The Machine Tools Industry goes through the cyclical periods, of progression and recession. During good times the industry at large is busy executing its orders. During recession or slump most turn complacent and tend to lose strategic vision, blaming the economic situation, rather than taking the situation as an opportunity to reassess resources and competencies, markets, threats and opportunities and redefine business strategies that can deliver

even better value to customers. Knowing that the greatest obstacle to discovery is not ignorance but the illusion of knowledge, and when the rest of the industry then thought they had come to the end of all possibilities, we realized that we needed to learn everything we needed to know. Believing that we had had the powers yet undreamed of and that we could do things we had never thought we could do was the beginning to surpassing the limitations in our mind. And that's how at MKL we took the recession of the 1990's as an opportunity. Read on to find out why and how . . .

This Lean transformation case study is also an example of a 'turnaround' of a Machine Tool company, from closure to market leadership position, commanding over forty two percent dominant market share. The figures in Sales, turnover, surplus revenue generation and other key performance indicators show massive quantum jumps. This case study narrates the leadership, strategic vision, intent, leveraging resources and competencies, breaking barriers, erecting barriers, creating new segments, concurrent engineering, rapid prototyping, business process re-engineering, introduction of substitute products; developing people, rightsizing and giving the business a protection from external and internal competition. This case study has many facets to it; a classic case of implementing a strong competitive strategy to successfully gain competitive advantage over competitors, the unfolding developments will enumerate the process of this business being transformed by changing its culture (DNA) from discrete to Lean, reengineered from closure to becoming the industry leader.

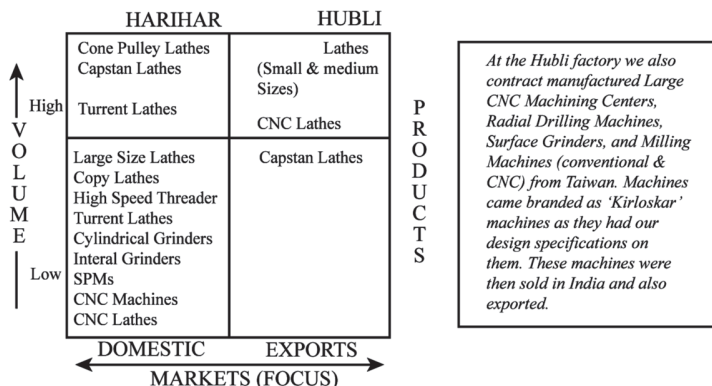
> BACKGROUND

Mysore Kirloskar Ltd started Machine Tool Production at Harihar in India in 1941 during the Second World War. A pioneer in the business, it made its entry with a cone pulley lathe named Arrow. The company continued to adopt technologies and develop a diverse product range in the years to come, in its endeavor to keep up with the changing technology and market demands. The late 50's saw the addition of Capstan and Turret lathes. The 60's saw the addition of Copying Lathes and Auto Lathes. In the 70's came the Cylindrical Grinders, Thread Rollers, High Speed Thread Cutting machines and Special Purpose Machines. Various models of low speed lathes were developed during that time; the 70's also saw the introduction of high speed all Geared Head Lathes. The advent of the 80's saw the induction of CNC Machines into its range and the removal of complete dealer dependability and reaching customers through its own marketing network. The company had set up its branch factory at Hubli in the early 1960's — to manufacture smaller size lathes for the export markets – and later, a foundry at Sattur to support the casting requirements of the Hubli factory, thereby creating capacities for new technology acquisition at Harihar. The facilities at Harihar also included a well established Foundry and Pattern Shop.

The product portfolio of the two factories can be put into the following matrix.

In the beginning of 1990, the company employed about 5000 people, and had a Sales volume of approximately Rs. 650 Million. 1990-91, fifty years since its inception, the company had been through many difficult situations and

LOCATION



recessions were not new to it. This recession was different from the earlier ones, because it combined with the onslaught of increase in imported machines forming a greater part of market consumption, because of quality, reliability, service and costs. And the domestic players had to cope with not only the decrease in domestic demand but also the onslaught of imports at reduced import duty (liberalization).

> APPROACH TO MARKETING THEN

Historically the company's distribution was dependent on four dealers up to mid 80's; each one to handle a family of products. They all handled product Sales and distribution on an all India basis, through their various branch offices.

In the early 1980's the company decided to set up its own marketing network and get closer to customers, to understand better the changing market needs and trends, and fulfill its growth plans and long range aspirations. Also there was a technology shift from conventional to

Computer Numerical Controls (CNC), and the present network of dealers were then not equipped to handle this technology shift and provide complete solutions nor drive the company from the front end projecting the futurology and driving a change.

The shift in marketing strategy was to tread cautiously, by first establishing two branch offices one at Pune and another at Bangalore. While Bangalore office covered the four southern states, the Pune office was left to cover the rest of India. These branches succeeded in fulfilling their objectives. The Pune Branch led the success story and almost single-handedly drove the company onto a platform where it could build further. These results encouraged opening up of more branch offices in other potential industrial areas. The network of these branches was now expected to handle the marketing and order booking of Machine Tool products for both Harihar and Hubli factories.

The branches handled products at two ends of technology, the CNC machines at one end and conventional lathes at the other end. The price of the CNC Machine was many times over that of a conventional Lathe. The branches made their order booking and Sales projections and had to achieve them. More often than not they compensated the loss of many Lathe orders by any one high valued CNC machine. Although the marketing conferences tried to conduct analytical forecasts both by numbers and value, yet somewhere down the line the focus on value overtook the numbers and definitely the CNC Machines rode priority over the Lathes. This started culminating in a much lesser marketing focus on the lathe business, which was by now surviving more by inertia and not by efforts.

Seeing this trend and prompted by the Business Development cell in 1990, the company undertook setting up of 'small dealer' network across the country to sell the

lathe products. The conception guidelines laid down was to appoint one dealer in a district (a district could be based on geographical descriptions or on industry density). The Marketing VP who took it over from this point instructed all branch managers to select and appoint dealers in the areas covered by them. The guidelines on territory distribution, infrastructure, experience, capabilities, policies, targets lost focus. It appeared branches went on a rampage to record booking of dealers by numbers. The consequences were many; there was now a mixture of few good and other dealers. There were dealers who had their own setups or establishments of dealers operating out of their homes. Some cities were unmapped and yet some had as many as six to eight dealers. This created frequent fights among dealers to grab the same order and they often asked the company to umpire their disputes. This led to ineffectiveness, exploitation, and caused damage to the process and the company. The smart customer used one dealer against the other to bargain for a better deal. The company many times took postures on prices and pricing that varied from being a certain percentage lower than its nearest competitor to considerations of a premium brand and status of orders on hand.

The lathe business from the Hubli factory was at one time a predominantly export business. At the best times during 1960's and 70's almost eighty five percent of lathes produced were exported to USA, Germany, UK, Canada, Australia & New Zealand. The first four took the bulk; eighty percent out of those exported, and these were mature markets for MKL. The recession of the 80's had a disastrous effect on most of the Machine Tool world. Some closed, some limped for a long time, few used the opportunity to turnaround and became success stories — Japan emerged to vie for leadership. This recession

also saw many MKL dealers abroad close business or sell it away. In the process MKL lost most of its high performance dealers. The consequence was a sharp fall in exports – only Germany lingered on. There was however a short spurts in exports to USSR which was gone soon with its disintegration. Many efforts made to revive the dealer network fell short of success in achieving the objectives.

At MKL, the work of training managers and workmen on the Just-in-Time (JIT) techniques began in early 1991, conducting teaching sessions and workshops for people to build appreciation of the philosophy, concepts and fundamentals of Just-in-Time (JIT). The phrase ‘Lean Manufacturing’ was not even coined then. So, we just called it as implementing JIT or sometimes called it World Class Manufacturing. In the compartmentalized system then Marketing was centered at Bangalore. The dwindling orders received a shot in the arm by receiving bulk orders from Government of India’s Labour and HRD Ministries for Center and Capstan Lathes. In spite of efforts made by marketing through schemes and discounts, the effort yielded no results. However the manufacturing process was now making efforts getting into the JIT discipline, but the marketing was not. Obviously all or any strategy if used was to push Sales; missing out on thinking “what action would cause an improvement on the pull from customers?”

> THE LEAN IMPLEMENTATION

“Organisations don’t succeed, people do,” and so I believe it takes a passionate leader with a dream, vision, belief, dedication, commitment, perseverance, faith, integrity, patience and ethical behaviour to lead and succeed on this journey. And it is important that such a person be completely in charge and at the helm of all decision

making. I was in that entire person in the sense I was entrusted with the job of leading and transforming MKL Hubli factory to becoming Lean. I was lucky in many ways that both my Executive Vice President (EVP) and Managing Director (MD) were keen on seeing it succeed, so not only did they support this transformation completely, but more importantly, kept my detractors away. That's how change was given a chance to succeed, and I credit them for this success. Leadership is the reason why Lean implementation succeeds; at the same time in all the failed, unsuccessful or cosmetic attempts, lack of leadership, weak leadership or reluctant leadership is the cause why this success eludes most.

Back in 1991, Lean Manufacturing in India did not have the exposure that it has today. It was almost unknown except perhaps in bits and glimpses to a few individuals. We did not have a Sensei then, so we had to understand the basics, apply our minds, brainstorm, fail twice to understand what does not work and build on this learning. On hindsight I consider us fortunate as we learnt through actions and healthy conflict; people really began to contribute ideas and before we realized it we were in a hurry. I remember, when our MD visited us every week, each time the changes were visible to him – the layout itself, much reduced WIP, problems solved, improved flow etc – and each time he would say; “Arre, everything looks different, so less material, so clean . . .” And that appreciation spurred us on.

One of the earliest decisions we took was to close the historic Production Planning & Control (PPC) department, and also the conventional Inspection department. The PPC's theoretical planning for Production (or inventory?) was completely replaced by a pull system by the customer which we called demand rate and matching it was achieved by varying the flow rate. We had a good set of technical

brains in the company who developed a simple and practical ERP system good for any manufacturing company. It was called ‘AMRUT’ – Advanced Manufacturing and Resource Utilisation Techniques! Manufacturing requires a very simple ERP system and this is understood by those who know how to design their business processes Lean and ask for a well knit simple algorithm tool only where required. When we keyed in the flow rate into the software of the main server, it had connectivity with the Bill of Materials and Purchase ordering system, thus governing purchases or authorising purchases linked only to flow rates. Thus, if the order inflow slowed down, material inflow also slowed down automatically and vice versa.

Historically the Inspection Department had an aura of bureaucracy around it, judging the wrong but never or very rarely contributing to problem solving and eliminating problems. Inspectors typically liked to take credit for delivering the right quality in case of a satisfied customer but always had the Production to blame for a quality debacle and a dissatisfied customer. This inspection department was now recast into two distinct parts, one was the Quality Assurance (QA) which focused on Certifications and Quality by Audits besides being responsible for the Metrology lab, Standards and Calibration, and this was a smaller group of just a few persons. The remaining part of the Inspection manpower was integrated with the manufacturing cells, but with new and redefined roles. They were now classified as ‘Process Controllers.’ The inputs that go into good successful manufacturing are: validated drawing with the latest revision number, proper process, Route Card, Job Card, well maintained machine, well maintained and calibrated jigs, fixtures and measuring gauges, proper cutting tools, the right quality raw material, trained operators, check lists where applicable and correct work instructions for any special process. Using the

principle that if everything at the input stage is correct and the process is excellent, then what comes out of the line must be of good, acceptable quality. The right process will always produce the right results. The Engineers job now was to perfect the processes. The Process Controller's job was to certify the inputs into the line, audit during the process and at the end of the line, assist the operators in enforcing Jidoka, and also blend with the cell in their problem solving teams besides reporting on the cell quality. The process controller would report to the cell in charge.

The change from PPC to customer regulated Flow Rate was the beginning of learning to dance — it had driven the Production to become responsive and customer focused. Similarly, restructuring the inspection had driven the factory, from, Quality reporting to Problem Solving, people involvement and quality improvement that resulted in Quality consistency and improved customer satisfaction.

We now used the Demand Rate as a crystal ball or a predictability tool, to see into the future and forecast market trends and behavior by numbers. With this tool we were able to foresee and predict a closure of the factory almost over a year before it happened. We tried to alert everyone on this scene, in an effort to push the marketing chaps to come up with a survival action plan, yet no definite or successful marketing strategy emerged to prop up or revive the order inflow.

We had seen signs of such eventuality and were not being able to do much about it then, as the factory did not control marketing - except make the facts known. We had however tightened up on the Purchasing system, Purchasing at equal to consumption rate and if one single part was required then only one was manufactured – whether it was a casting or forging or steel bar did not matter. The other steps we had taken were to tighten up on debtors (balance payments on Government tenders) and reduce it to bare minimum or

zero. All these steps were taken to generate sufficient cash reserve and not to depend on external or internal borrowings in the eventuality of a closure. This is the greatest intangible benefit of Lean Thinking. This objective was fulfilled completely. The New Year of 1993 had nothing much to celebrate and opened with almost no orders. The factory had already been working for part of the week. The year ending of March 93 had nothing to talk about at Hubli and soon after we closed for want of orders, and to put our turnaround strategy to work.

The flow rate had touched a low decimal fraction, which meant there were almost no orders to execute, either from the domestic or export markets. By now there were almost no export dealers, while the scanty domestic network was riddled with problems and lack of strategies and policies. I recommended a temporary closure of the factory to my MD, and we finally ordered closure of the factory until something could be done again. This was when marketing was integrated with manufacturing, and I was asked to once again take over marketing in addition to manufacturing. I wanted to make marketing and manufacturing as seamless as possible and bring customers into the Value Stream, now was the opportunity. I also had a very clear strategy for revival and a distant vision into the future on customers, segments, value and value delivery, channels, markets, market share, customer satisfaction, costs, profits etc. I was now able to unleash these plans.

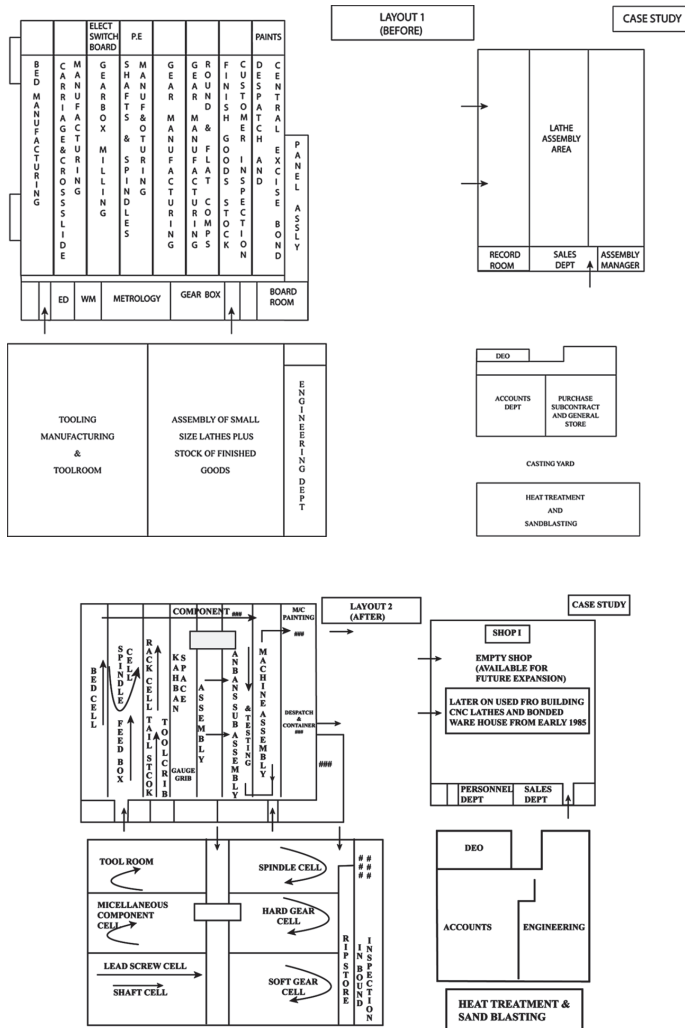
Among the key issues that confronted us were:

- Decrease in market demand. Increasing onslaught of imported machines and its gaining share of Indian market's consumption.
- Losing mature markets. Moving to a single market situation.

- Complacency of dealers under the changing technology situation in the market place.
- Branches lacked ownership for all products, and focused only on high valued machines.
- No focused pricing policy.
- Negligence of domestic markets in the previous years had removed barriers for low end competitors.
- Lack of a successful strategy in developing Export markets after the recession of the 80's.
- Was there absence of leadership and vision through the 80's?
- Manufacturing Strategy did not focus on demand and consumption.
- Factory layout conformed to group technology concept, and was not improvised.
- Absence of employee involvement in problem solving at grass root levels in Quality improvement.
- Supplier power ruled in some cases and impacted costs and delivery.
- Purchase ordering system was not demand focused that resulted in imbalanced inventories.
- Not really market driven but at some level wanting to dictate the markets with available products.
- More manufacturing focused, less value addition into services.
- Which generic strategy will drive Sales higher?
- Does the market have an option of alternate product or process?
- How have we treated our customers?
- Have we tried to rule the market rather than lead it?
- What made MKL's products sell and stop?
- What is the situation with customers and competitors?
- Are we in the right segments or the wrong ones?
- Have competitors entered our segments?

- Did MKL fail to erect barriers for lateral and vertical entrants?
- Are there barriers in shifting segments?
- Will there be a technology shift making existing products obsolete?
- Where are the volume markets?
- What strategy is relevant today?
- What is the competitor's response profile and behavioral pattern under these conditions?
- Why have the orders dried up?
- Who has entered MKL's segments and displaced us?
- Why are we not able to compete in the International markets?
- Why had the factory to be closed down?
- Which business processes went wrong?
- No focus on acquisition of new markets, new products, segments, market shares, product variety, and substitute products.
- Very high lead times in manufacturing compared to global standards.
- More than necessary manpower.
- No quality accreditation yet.
- Outdated or conventional setup for parts manufacturing.
- Too many parts to be manufactured (15,000 part numbers). Parts were unique to each model.
- New product development had gone to sleep for a long time.
- Wastage, rework and rejections were at high levels.
- Developmental lead times were high.
- Factory was closed. Now it had to be turned around from closure.
- Organisational structure was hierarchical.
- Lack of vision resulting in lack of strategy to counter the effects of the recessions of the 80's and 90's.

It had taken me and my team about a year to understand and implement the basics. During this time the layout was undergoing changes regularly, and we always let the process decide the layout. The two diagrams Layout 1 and Layout 2 depict the overall macro view. From a scattered and historical layout, the new organization was in a cellular layout also called factory-in-factory concept or a focused factory layout.



Some parts, which traveled in kilometers to complete all their operations, now moved a few meters of those distances and were completely visible to the eyeball. The visibility that was lost earlier in tracking, tracing, counting, stacking and supervising of parts was now brought under the eye ball control of the cell. The Managers and Supervisors found it worked better; the workers were surprised and happy. Parts in the part manufacturing area were now visible and traceable. WIP was reduced. Imperfect flows were vastly improved. Manufacturing to forecasted plans which created inventory, had given way to manufacturing just what was ordered so it was sold. Heavy emphasis and focus was now on reducing throughput times, lead times, defects, deviations and variability.

The western industrial system had sold us the ideas of forecasting and MRP. Although we saw it never worked to expectation year after year we still kept at it and only labored with more pains. The whole Production plan was built on the fear of 'what if' rather than on customer demand. One of the earliest decisions we made was a long term philosophy decision to move away from the 'batch or push' Production system to the 'pull' system. To change it all we really had to change nothing at all, considering that the only thing that changed was in the way of our thinking. Factors that influence success in Lean Manufacturing are leadership, vision, commitment, discipline, focus, patience, long-term thinking, goals, investing in people, manufacturing facilities and the products themselves.

> LONG TERM PHILOSOPHY

In moving away from the push to the pull system of production, our long term thinking was that we were prepared to give it whatever it takes and the time to allow it to take roots and succeed, even making short term sacrifices. Leading the change it was important for me to stay focused and committed to the Lean implementation at all times every day. If leadership commitment is not there, Lean will not succeed. We realised early on that the success would come from building the Lean discipline into everybody's daily routine, and that the behavioral pattern needed to be different. That these habits need to bring in a very heavy focus on waste removal using the JIT techniques and tools we would use, while empowering every employee to enforce Jidoka.

The thinking culture we reinforced was 'do the right things for the customer, company, employees and the society at large.' It was very important for the company to align itself around satisfying the customer. At MKL we did many firsts; such as, developed one single common price for all customers— big or small, whether he ordered one or many – this ensured that no two customers ever paid different prices for the same product. The pricing was also the lowest possible we could accept, and so there was no discussion on discounts. The customer could not get a better price from any competitor and we could leave the order unhurt in the face of any discount wars; which there were none because no competitor had done as much work on cutting costs through productivity improvements as we had then and shared the savings with the customer!

To structure this process, we developed nine governing principals (rules) that were operating policies and an

end user pricelist. These were written down, signed by the Managing Director and handed over to each and every branch office and distributor. This created the right environment to do business. When we discovered defects we spared no efforts or costs to replace the parts or to rebuild the product even if the product had to be brought back from overseas. At MKL the ultimate test of our character lay in the way we treated our customers; and we treated them like somebody who could not fight back.

In building trust with employees we never let business decisions undermine trust and mutual respect. In 1993 we had to close the factory because of no orders; we invited the employees for a discussion to explain a proposed strategy that could revive the business. This included paying the employees a part of their salary while they stayed at home and let the Engineers conduct what we now know as the most intensive market survey undertaken in the Machine Tools industry, across the length and breadth of India and in our emerging overseas markets. The openness in our discussions, paying the employees part salaries, letting them visit the factory to seek information on the progress, and calling the required employees to build machines when orders were received during the closure, built confidence in them on the genuineness of the management's intent to remain in business. While trust is hard to build, it is the character qualities of the leader that helps build it.

For a business that had produced machines and supplied over eighty five percent of the numbers to America and Europe, using batch thinking, this change in the manufacturing strategy was a cultural renaissance. From discrete thinking, bringing in Lean thinking is a cultural transformation for any organization. There were

two major intents on the strategic blue print; the first was to be able to produce and deliver products in small quantities, with short lead times to meet specific customer needs including day to day shifts in customer demands. The second was to have a built-in-quality in the products. Succeeding with these would also differentiate us from the competitors.

> THINKING LEAN

We went about changing our culture using a systematic approach. Firstly we put the customer ahead of everything. We spoke to over ten thousand of them, the actual end product users, and analysed their needs using the problem solving tools. We realized that it was necessary to define customer values as the first key step – while it would be quality, delivery, cost, and service; differentiation was at the top of our minds. By monitoring the demand we developed a tool called the demand rate. This is like a moving bar that changes regularly. This is a predictability tool that can be used to forecast the most likely future trend, and I found it far more accurate than the MRP based forecasting, because it is based on market consumption. We then defined our Value Stream, where the demanded value had to flow at a defined rate uniformly throughout the Value Stream – from the raw material processing stage including vendors and suppliers, through the manufacturing cells and assembly lines to the customer. We worked hard to make it flow by eliminating the causes of waiting and other delays, superimposing the known intrinsic capacity of the factory at that point in time to define the flow

rate, or the rate at which the value would flow. This is in sequence to the demand rate and authorises purchase ordering accordingly, defines pull quantities and the rate at which material flows through the Value Stream. We now had authorized ordering of material based on a firm customer order. So now, we were actually pulling from the customer backward. This assured that there would be no unwanted inventory. By working on a culture of reducing time, from the time a customer order came in, to delivery, to the collection of payment, we were actually striving for excellence trying to bring down order to delivery time!

I believed that the right process will always produce the right results. I had empowered the workmen to stop the process whenever there was a process error, when the previous process pushed bad parts or assemblies, or if there was a wrong revision number on the drawing, or a problem with the machine or tools, or if they were instructed to carry forward a faulty process with an intent to correct it in the future, or if there was a balancing problem and flow was getting interrupted. They were told to call me on all such occasions. So whenever a thing happened, all of us on the shop floor were involved in the problem solving process. The beauty in a one-piece flow is, if some Production problem occurs, the whole line stops. So this is a demanding discipline that we did not shy away from inculcating. But on the other side, when Production stopped, all of us were forced to solve the problem and eliminate it – continuous improvement. This built better teamwork and also made the team members grow. During this process we had realized that shortening the time which elapsed between raw material and the finished products would lead to better quality, lowering the cost and shortening the delivery times.

This flow also induced other aspects such as built in quality, and use of other Lean tools. The Lean expression like lowering the ‘water level’ of inventory, exposing the problems (like rocks in the water) and removing them, if not sinking with them was all we needed to understand in those days and we did. This understanding kept us going. Traditional processes tend to think it takes days or weeks to complete a particular process, while Lean Thinking can accomplish the same in a much lesser time. For example at MKL, a spindle used to take about six to eight weeks to complete with waiting stations at many places enroute in the process. The component also travelled a few kilometers distance in the process. After implementing the cellular layout and flow concept the part was not only completed in two days but was far better in quality too. The second day was more because the heat treatment worked only one shift. We experienced similar benefits with slide assemblies, gearboxes, gears, screws, machine beds and other components, many of which were now processed in less than a day throughput time.

> LEARNING TO ELIMINATE WASTE

In our attempt to eliminate all wastes, we looked at areas where we were producing quantities more than the actual demand and searching for areas where we were still stuck in the ‘what if’ mode of thinking in the Supply Chain; we searched and tried to eliminate from the process as much of the material waiting for want of machine or man as possible; through constant changes in the shop layout, we minimised the movement of material and the need

for non-productive men; by implementing strict process reviews and process implementations we eliminated the unwanted and repeat operations, and strived for process excellence; by highly standardizing our methods we were able to specify the authorised inventory (WIP) as equal to the difference through cycle times and / or supply lead-times from the previous operation. This was done by harnessing unused employee creativity. We reduced overproduction by strictly adhering to the 'pull quantities' or signaled qualities through the pull cards or signal cards, which were reduced in proportion every time we achieved lead-time reduction. By multi-skilling the operators we eliminated any process waiting for a man.

The only time any component waited for a machine was in case of a breakdown, but most of the time our breakdown times were less than one half of a percent of total available time. By relaying the manufacturing lines as and when an improved process was discovered, and by using the flow concept we were able to eliminate unwanted movement and non-value adding processes. In other words, to us at MKL flow meant that when the customer placed the order, it would automatically trigger the process of ordering the raw material and it would flow to complete itself into delivery.

At MKL our achievement was the ability to flow a single piece where the customer order was a single number (as in one only). This was a mindset achievement. The benefits we realized were: the quality improved dramatically and saved a lot of money, which we shared with the customer. We became very flexible and were able to change over models in a small turnaround time. Embedding the Lean principles and the concept of always doing it better than yesterday helped our productivity to go

up many times in a short time. It happened even as the manpower numbers went down gradually by about twenty five percent. We freed up one complete hanger— almost one third of the floor space and used it for expansion – developing new products. This helped to add new products without addition of capital and manpower. This kept the costs down, improved the top and bottom lines many times. It dramatically improved the morale of the employees.

Manpower reduction is never a goal of Lean Manufacturing. Neither was it with us. But at MKL over the past decades we had accumulated many diseases that needed cure. Over time a culture had developed where the Union Leader's productivity was dismal. Some workmen had diseases of the heart, some had had strokes, some tired easily, some exhibited chronic sickness, some were addicted to the bottle, some were habituated to stealing, and some were chronic absentees. So we had a chat with the concerned workmen and the labour union and showed them their level of productivity with the help of the captured data. The Personnel Manager investigating from leads found out that one of the Union Leader had declared wrong personal date of birth and had not submitted to correct it when given a chance to do so. When confronted with the offence he chose to quit. We backed it with a very attractive voluntary retirement scheme for the categories I mention above. They all took the proposal and went on to relocate themselves. Ofcourse we lost some good workmen too, to the scheme.

Colchester was the first Machine Tool Company that built its machines on a moving assembly line I think from sometime in the late 1970's. Many senior management personnel who had been to Colchester factory in England and seen the moving assembly line were impressed and

came back and talked about it. There were even suggestions to do it at MKL as early as late 1970's and early 1980's. Somehow it never got done. We once again discussed the subject of working with a moving assembly line. This time the question we asked was "do we really need a moving assembly line or an assembly process that turns around on a work station very fast?" We asked, "Which one delivers our customer better value?" We found that because we had the advantage of having developed high velocity for component flow, working with fast turnaround stations would use lesser floor space, give us the Flexibility of moving assembly stations to relocate them if demanded by a better process and not require investment into guided rails and the limitations of dedicated positioning. Besides there is no point in having a moving line that is stationary for most part of the day, consuming from stored inventory – what a visible waste to a Lean mind! If eight stations produced eight machines of the same model in two days, you got a machine delivered every two hours (for that model). The decision also was driven by the understanding of Takt time. While a moving line would have wrongly impressed the unsuspecting customer and been no more than another marketing gimmick, but would not have delivered any faster!

> ORGANISATIONAL LEARNING

The processes were once dictated by the layout. But we had now understood that the layout must obey the process and that the other way around would be wrong. We reorganized the entire factory to become 'cellular' by continuously changing the layouts many times, trying to

WHAT WE DO AT STRATMANN CONSULTING

We specialize in helping our clients to successfully becoming Lean through proper implementation of the Lean Thinking, it's principles, philosophies and strategies. Teaching the leadership and assisting them develop people who through Kaizen and continuous learning process.

SOME RESULTS THAT WE HAVE HELPED OUR CLIENTS ACHIEVE:

- Reduced all forms of Wastes
- Vastly improved Value Addition and VA Ratios
- Reduce order to delivery times upto 94%
- Reduced different lead times upto 90%
- Reduce inventory by over 90%
- Performing at above 99% on-time delivery
- Quality improvement above 90% of present levels
- Reducing floor space usage by 40-50%
- Overall Cost reduction upto 60%
- Upping the profitability many times
- Increasing Enterprise value upto 10 times of present
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27. Textile Machinery
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30. Yarn Manufacturing (Textile segment)

create continuous process flow and bringing problems to the surface. The newly structured 'Cellular Manufacturing' adopted the 'pull system' to avoid over Production, and implemented the single piece flow concept to a great extent. The cells popularly used a straight line or 'U' layout, with almost all operators multi-skilled to operate a minimum of three machines based on the one-up-one-down concept (one forward, one backward). The employees were empowered to stop the process if it produced rejects or deviations to the standard. Quality circles became active at solving problems and making improvements. The one thing they passionately did was to inculcate a culture focusing on the root cause of a problem and eliminating it. The learning from the improvements made was shared across the organisation. This helped organizational learning.

We had leveled out as much workload as we could. Our productivity improvement came from eliminating non-value adding activities such as waiting, part or assembly travel and unnecessary movement of operator;



Multiskilled workmen operating multiple machines

reducing downtimes on the machines and assembly stations; and by improving and reengineering the processes. Components that earlier traveled kilometers, now traveled only a few dozen meters for machining to be completed. A machine was allowed to stop producing parts once the required rate of flow (output) was achieved. To level out the flow of material, we authorised stocks of finished goods equal to one week's flow or output. But, in reality such stocks were never accumulated as machines were produced against technically and commercially clear orders only. This translated itself into material Kanban's of proportional time sizes at critical stages. During the learning process we found this was better, than producing against a daily fluctuating demand – we were learning to become resilient. We changed our focus from keeping the operator busy producing inventory to producing against the actual demand. So an operator moved from one process to another if the demand on the previous process was over. We simplified the whole system by not keeping it all in the computers or in some files understood by few, but by transferring it on to the shop floors through a visual signaling system and under the eyeball control of the workmen, so everyone understood the same language and Production was a natural flow controlled by the workmen, while we tried to see that no problem remained hidden.

We found that by keeping lead times short and production lines flexible, we actually got higher quality, it benefitted the customer who gave us better response. We got better productivity and better utilization of space and equipment. Using the tools of continuous improvement and by re-engineering the processes, we released a third of the total floor area which we then used to house new assembly lines of CNC Machines and the bonded warehouse for products that we contract

manufactured in Taiwan. Our best machine upkeep time was usually above 99 percent achieved merely with good Preventive Maintenance. Focusing more on quality than on cost actually brought down the costs; coupled with standardisation and rationalization, we reduced a lot of cost and actually passed on huge price benefits to the customers – thus I think, passing the ultimate Lean test.

One of the best examples of customer pull and replenishment can be seen on the shelves of your department store. This idea is captured from the retail business. In the days when we produced to the push system, we had seen customer demand change many times. This had left us with unused inventory. A very ideal form of one-piece flow is very hard to achieve especially when a variety of part sizes and shapes and operations have to be handled in the same cell. So to balance the pull, we used knowledge of cycle times and visual signaling besides standardizing our work to level authorised work in process and keep it minimal. By using simple visual signal cards we built material Kanban's for managing and ensuring the flow and Production of material and the Just-in-Time Production system. These Kanban's were needed at the raw material stage and just before product assembly. As orders came in from the customers, they created a leveled schedule through the 'flow rate'. That flow rate was used to define the size of assembly stations and size of Kanban's; besides the order quantities on the purchase orders had to match the flow rate. The batch size on the signal cards automatically changed with the change in flow rate from their next cycle where signals had already ordered parts. We had defined the trigger point for reordering from each Kanban or bin as the time of picking the first piece since Kanban's were the size of one supply lead-time.

In our experience, we had learnt that customers do not buy products in a predictable manner. The push system has the risk of building inventory of unsold goods, in which case resources on hand will not be effectively and optimally used leading to an uneven demand and pressure on upstream processes. We worked on leveling the flow so that we could make what the customer wanted and when he wanted it. This reduced or minimized the risk of having unsold goods. It allowed optimal use of labour and machines and evened the demand on plant's suppliers and upstream processes.

Our success largely stemmed from the cultural changes we built in the organization, the changes in the daily habits that everyone went through and readjusted to. The principle we adopted was to stop the process in case it was producing defects with the intent to get the quality right the first time. In the beginning it created some havoc. But we had all seen worse. Very high rate of quality non-conformance, even machines were recalled owing to defective design, and customer complaints. With low levels of inventory, short lead times, Lean Manufacturing dramatically increases the importance of building it right the first time. At MKL we worked intensely on problem solving, error proofing, and training people on the shop floor and other work areas to actively participate in Quality Circles, Kaizen et al. We standardised to the maximum possible extent and continued doing it in the processes, documentation, designs, methods, actions etc. Our social structure changed from a coercive one to an enabling structure.

In our effort to simplify the processes and make them easy to control, we used the visual or eyeball control technique, where every form of communication was made eyeball visible. Visual signaling, defects and

action plans for improvement were boldly displayed in the respective work areas – shop floor or departments. Graphs displayed the present situation, improvement implementation plans showed the future trend. Visual display and by empowerment enabled the operators to better control the processes. Job rotation was practiced at MKL since the 1970's. When I reorganized the factory and re-engineered it, not only did I focus on making it a flat organisation but I also reallocated job portfolios of my Managers utilizing their competencies to the hilt. Having gone through perhaps the most job rotations myself – Design, R & D, Tool Room, Industrial Engineering, Planning, Production, Export Sales, Service, Domestic Marketing, Business Development, Factory Operations and Business Unit (SBU) Head – I had seen the problems with mismatch and benefits of the right fit.



Visual Signalling Kanbans

> DEVELOPING EXCEPTIONAL PEOPLE

Manufacturing is and should be the domain of great discipline. People with attitudes suited to exhibit such disciplines must be given charge of manufacturing. When we began to solve problems with mismatched inventory and poor supplier quality, we dismantled the stores from Purchase and assigned it to the Assembly. Similarly we assigned the raw material store and raw material in process store with the component manufacturing (Machine Shop), along with their incoming inspection and acceptance responsibilities. We made them independent factories within MKL Hubli and assigned the responsibility of controlling their incoming Quality and Quantity. The controls that were lax when the stores were controlled by Purchase function was tightened up. When we told the Assembly Manager that he must neither accept excess quantity nor poor quality, he shut the doors on both variables; we saw where over produced inflow was coming from, and where poor quality was coming from. He plugged all such loop holes. The discipline in the attitude towards correctness that he brought about was one of the best demonstrations that I have seen.

I had all along watched a colleague who was a stickler for discipline, correctness, timeliness, orderliness and usually a no nonsense type. He is perhaps the best follow up person I have seen to date, a stickler for timelines. He had grown with the organisation and knew its culture and processes. He had latched on to the JIT implementation very well and was on board. But, he had been assigned to developing vendors, where as I thought with his attitudes and competence he should be heading the Machine Shop and perhaps at a later stage the complete manufacturing. So,

one evening I sat down with him and showed him the plans I had drawn up for a new revitalised organisation. The chart I had drawn and his new role and responsibilities – KRA's and KPI's. He was shaken and uncertain as he had never before been entrusted with such responsibilities. He was unsure and asked me, "but what if I fail to deliver?" I could see through his moment of uncertainty that being a man of steel he could quietly resolve to take on any challenge. My teammate on the cricket field, I had seen him play hard to win and with dedication. And I said to him, "I am right behind you all the way, I am responsible for this decision and so while I believe in you and while I expect you to succeed, I will be responsible for any failure." He took up the challenge, settled in and did an amazing job. Later, when I was travelling opening up new export markets and developing a strong domestic marketing network, I had the confidence to let him hold the ship steady on the course that I had charted.

His predecessor was also one who had grown up with the organisation, had acquired good competence in Production processes, and was lively, sincere and dedicated to the organisation. He had values of integrity and knowledge of processes that could also be used elsewhere. He had quickly latched on to the JIT implementation and like the other two was also quick at delivering change. He was also a jovial and fun loving person. I put him incharge of Purchase and all procurements – bought outs and subcontracted material. With his process knowledge he was an asset in vendor development. He helped teach and implement our 'pull' system with all suppliers. He helped rearrange their shop layouts thereby easing the flow. He developed a few critical tier one vendors from the existing ones. He helped implement the signaling system, standardisation

and rationalisation tools in procurement, and reduced the number of vendors from 178 to just 33. His strengths were very useful here.

In-depth processes and Industrial Engineering knowledge and concepts are necessary to design standardised work and implement it. I picked someone who had the right qualities here. We would visualize the future, develop the processes try them out and standardise. He had understood the change process and was on board with the JIT implementation. He played an important knowledge resource as we strived to balance our cycle times and improvise on flow. With his competence, when we later developed CNC Lathes, I put him incharge to setup the assembly and flow. Result; we quickly became the largest producer of CNC Lathes in those days.

While I directly worked on developing markets and creating new segments and conceptualizing new products with a vision for a dominant market. share, I needed a strong Sales administrator who could document orders, do the contract reviews, order Production through pull cards, resolve customer complaints, organise deliveries and collect the money. I had someone who was also a no nonsense person, had a great attitude towards quality and correctness in minute details, very skilled with his own hands and experienced, was exposed to western customers through living in the USA for a couple of years. He was good at applications and solutions. He had one of the finest qualitative minds and demanded quality. Being personally well disciplined he suited the job profile very well. Not only did he readily accept the job but also performed remarkably well. I almost had to spend no time there after the course was charted. He held the ship very steady, implemented all the Sales policies effectively, and was a great hit with all the distributors.

Dominant market share requires customers and products. The closure of the factory had posed many a questions to us:

- What if our products became obsolete?
- What if the process (our product answered) became obsolete?
- How are we going to erect barriers for new entrants, and with what products?
- How are we going to break barriers that are preventing us, and with what products?
- What should be our differentiator?
- What if we do will we add more value to our customers?
- How are we going to battle the price competition from China and Taiwan?

Personally I believed climbing to the market leadership position was a piece of cake. But many parts of the puzzle needed to fall in place, or be made to fall in place. My head was bursting with ideas and strategies. Having foot-slogged the industrial estates of the country and interacted with thousands of machine users, I had conceptualized the designs in my head for various products. I needed someone who could run with these ideas and translate them into prototypes with great speed. We had no CAD in those days; everything was to be done on the manual drawing board. Over the years I had developed respect for someone who I had seen as a designer, application specialist, sales support person, assembly supervisor, quality engineer and above all a person with positive and possibility thinking attitudes. I picked him to lead us in our new product developments and to head our Engineering function. He accepted and led the small design team of five Design Engineers and equal number of draughtsmen. When we had to scrap existing designs

and develop completely new designs, he took on the challenge and delivered:

- Twenty seven new models developed from drawing board to markets in one hundred days flat; a benchmark even today
- Standardised and rationalized the parts to bring down the numbers from 15,000 before to just 800 across all models
- Was the first in India to develop Modular Machine Tools
- And many more.

In our strategic business unit the customer always came first, people were treated as most important asset. I strongly believe that while machinery depreciates, people appreciate in value. Learned skills were shared, we believed in seeing the problems visually and solving them. Kaizen, JIT, Jidoka and effective thinking built our supportive culture. For exceptional results you must develop exceptional people or leadership. The result of developing exceptional people and teams produced remarkable and substantial growth results at MKL Hubli rapidly, some of which are stated at the end of this chapter.

> CONCURRENT ENGINEERING, RAPID PROTOTYPING, STANDARDISATION, RATIONALISATION

The factory had to be closed for want of orders, but we also had to do some soul searching. The market survey that we undertook both in India as well as in the overseas markets is stated to have been one of India's most intense and extensive. I had read a Harvard case study of Toyota

having done something similar in the 1970's. With over ten thousands of end user feedbacks we had a task on hand analysing the feedbacks. We put all the feedbacks through a Pareto analysis and picked the vital few to act upon. The result; we had to scrap all the existing designs and redesign every new model. The process then was manual on drawing boards and normally took a long time from design to market. I had seen this when we developed the Enterprise series of machines. We did not have that kind of time span.

When the orders were depleting – it was also the global recession time of the 1990's – some of my senior peers had hatched a plan to close the factory at Hubli and shift the products to Harihar. In my absence they communicated such plans through my MD to my team. This had spread a gloom in the factory, demotivated and left everyone feeling scared and insecure. I even saw that the usual cheerfulness that used to be in the lunch canteen was gone; one day after lunch, I gathered everybody on the lawns outside the canteen and told them, “yes today we don't have orders, but this I promise you that soon enough we will have so many orders that you have never seen such demand in your lives, and under those circumstances nobody will move you out anywhere!” Although I had a dream and a strategy in mind to realise such a situation, and was confident and sure of doing it, in that environment and at moment in time there were few takers, especially since they had heard of the possibility from my MD. They could not see what I could. But in those moments, I sensed that nobody wanted to go to Harihar. This meant they were sold to the only hope – my promise. I never failed them.

Using the lessons we had learnt along this Lean journey, the excellent team work that had been developed and aided

by possibility thinking, we decided to do every activity in a synchronized manner and concurrently. We made it to work like a machine, and it was this machine that delivered the results stated towards the end of this narration making us the dominant market player once again. As the designs were completed with speed, design and process reviews, vendor selection, rate contracts, patterns, tooling, prototype development, debugging and final product, onto existing and new markets happened almost with the smoothness of silk. It was difficult to see where which ended and the next began. It was seamlessly done with Jidoka in mind. It's by far the most well oiled human machinery I have seen at work. It's not only hard to explain it but also to create such high levels of motivation. The process entailed many sacrifices that most made. The result of concurrent engineering: it took us one hundred days flat to deliver twenty seven new models from design to market, a benchmark waiting almost two decades to be bettered.

I had inherited a historic business vertical given in my charge to lead and excel. With a Machine Shop of only conventional machines, we had to jig and fixture every part very well for repeat accuracy. I had to do this with fifteen thousand part numbers. Now that's challenging. So I set a challenge for our design team and said to them, "seventy five to eighty percent parts used in the new designs must be common parts elsewhere, twenty to twenty five percent parts can be unique. Also that I want a common basket of minimal parts that can be assembled like a mechano set, and made to match any global specification required." The result: they delivered me a basket of just eight hundred parts including bought out, hardware, electrical, rubber et al. This was one of the best examples of standardisation and rationalisation seen till date even two decades after.

> VALUE CREATION

With the changing customer expectations on one hand I faced the threat of obsolete machines and obsolete process; on the other hand I was building a network of distributors whom I had to strengthen by creating better value for them. I needed a strong field force and a good range of products to accelerate growth and become a dominant player. The opening up of the economy and reductions in import duty on capital goods had brought in many overseas players who were able to offer machines of good quality at low cost. The market shifted from domestic manufacturers to overseas ones in a big way. While the Machine Tool Association pleaded with the government for protection, I was curious to find out what made their costs so competitive. We were by then thinking of cost on the basis of activity rather than the conventional apportionment. So I took the Head of our Finance with me on a tour of Taiwan's Machine Manufacturers so we could each see it differently and brainstorm ideas of a possible strategy that we might use. There really was no secret. They were simply more productive. They made profits working with a value addition of twenty five percent or less, where as in India we were taught by the West that fifty percent or more was necessary – not for increased profits but for padding up with inefficiencies (wastes).

We came back and pegged our conversion on similar basis. We first made our pricelist and then went about reducing costs through productivity improvements; now not on the basis of cost plus as before, but price minus. We thus embarked on our journey of crunching costs, becoming more productive and thus made more profits. The demand in those days was much less compared the

potential to supply, hence we had to fight for share and innovate ways of expanding our markets and segments. Everything of Lean Thinking I have narrated helped us. The Indian customer is price sensitive. The Indian CNC Lathe manufacturers were not competitive; this included our factory at Harihar and our joint venture company with Warner and Swasey of USA. I saw an opportunity to win customers and market share competing with the Taiwanese, Koreans and Spanish machine builders. Resulting from another market survey, we specked a CNC Lathe that would be a good starting point for us and open a new market segment in India. With a fixed and variable spindle speed options to choose from providing excellent torque and power characteristics, a large work zone, an automatic tool turret etc., the machine was a runaway success. In the very first year of the product life cycle it commanded over ten percent of the market's share of consumption, and soon we became the largest CNC Lathe manufacturers in India (by numbers), offering larger specifications at competitive cost and competing with the overseas manufacturers.

All the other CNC Lathe manufacturers came to me and said to me, "Sanjeev, you can't sell a CNC Lathe at such low cost, you will lose money." I would listen to them silently and smile within, for they did not know what had hit them. We had delivered such value to the customer that it had distanced the competition a long way. I merely said to them "but my Accountant doesn't think so!" For my Accountant had and come to me saying, "You better tell 'him' that my accounting calculations are correct, and not to bother me with recalculating so many times." Meaning that my Managing Director had made him do his checking and recalculations five times for he too had difficulty believing the amount of surplus money we were

generating. I guess he then got used to it. All the lessons of removing wastes had helped us to prevent wastes at the beginning of all new products and processes.

The distributors were delighted to market this product, as it upgraded them in the CNC domain from conventional. But this was not good enough; I wanted to equip them more complete when they went to a customer. Certain products that we did not manufacture were Milling Machines, Radial Drilling Machines, Surface Grinders and large size CNC Machining Centre's. Those who made such machines sold them at exorbitant prices. We conceptualized the specifications and critical design areas related to spindles, guide ways, screws, accuracies etc, and went scouting for suitable collaborator who spoke our language, understood us and would deliver to our requirements the way we wanted them. We did not rush into it, but took our time to sort out the ones where we were confident about good consistent quality and short lead times. We pegged the price through a volume commitment. When these machines came in they were a runaway success for their quality, price, performance and for the brand they sported was Kirloskar. The distributors were now delighted that they had a complete array of machines that could address any customer needs. This prevented them from the need to look for other manufacturers. Our customers could now have all their requirements met by our distributor like a single window. We then concentrated on training them on every product, its selling features and benefits, installation and commissioning, maintenance, application etc, which made the dealer meet customer expectations better. The result: during the recession or slack market conditions of the 1990's when our competitors struggled for orders, we were flushed with orders! There were many such strategies and game plans we implemented that created better value for our customers.

> THE JAPANESE THUMBS UP

We were looking at diversification into areas where our core competencies could be utilised, as well as new growth areas. Two potential areas were Textile Machinery where our machine building competence could be used and Auto Components which was a growth market; then were areas where we could use our machines and component making abilities. Our Managing Director did visit Textile Machine manufacturers in Europe and Asia. Toyota housed both the possibilities as they manufactured Textile Machines under the brand name 'Toyoda' which is also the house name of the family that started the Toyota Car Company. After the opening up of the economy, story has it that everyone went to Toyota inviting them for collaboration; an offer that was declined by Toyota.

Taking the route through Textile Machines may have proved good thinking, though it was with some convincing that Toyoda Textile Machinery Company agreed to pay us an exploratory visit. They were to pay us a short visit at Hubli, but once they saw the factory stayed with us for three full days and took a thousand photographs. It was not necessary to explain anything to them, for everything was visual and it was at best a poor copy of their own system. They understood and appreciated the attempt. They spent time 'standing in the chalk line' and observing each area in our Value Stream. They studied all the charts displayed on the shop floor, all the problems identified and their solution action plans. They spent time observing the quality circles at work and heaped some praises on them. They looked at our process conformance, quality acceptance and measurements, workmen involvement,

housekeeping, safety, problem solving, workmanship etc. On their next visit they presented me with three huge albums of photographs they had taken, and telling me they never expected to see what they did and that too without the help of a Sensei!

Such commendation coming from the Japanese endorsing our efforts in going Lean gave us motivation and spurred us on. I believe that the visual of our factory may have indicated cultural similarity and understanding of the same language that may have worked as an ice breaker in the joining hands of Toyoda with Kirloskar, although there were many other factors that had to be worked on and made to fall in place. I have read that going Lean is not just cutting costs or improving productivity or profits; but it should help create new opportunities. The company's foray into Textile Machines and Automotive business with Toyoda bears a testimony to such possibilities.

> CHASE LEAN, NOT AWARDS

At MKL, I must confess we had one advantage. This great organisation had been led by some great leaders through all decades. The leadership in its early days had been very disciplined and dedicated to developing very good processes and ethical practices. The correctness of a process was given importance. Qualitative practices were very well developed over the years. New incumbents underwent two years of rigorous training in all functional areas, and their appreciation of levels of quality and acceptance were developed to high standards. On the finished product anything substandard was neither

accepted nor tolerated. As a result the quality perception and practices of everyone were developed to high levels. That is how the company was able to successfully export eighty five percent of its produce to first world markets. The products sported a product quality certification from TUV of Germany long before the ISO came in vogue.

We had been mulling on the ISO certification since the early 1990, but had not progressed because of the recession and dwindling orders. Sitting in an MIS review with my managers one Monday morning after we had put the new designs out in the market, we decided to go through the certification process. There was excitement and a rumble about the great preparations needed. My basic guideline earlier had been “let’s write the manual the way we currently run our processes, let’s not write what we intend to do.” Clauses were so answered. I had overseen every micro process changing from discrete to Lean and had personally ensured each was satisfactorily embedded and inculcated into the daily habits of everyone. Where the inputs were right and the processes were well honed, I was sure that the result would be right. My confidence level in my people and our processes was very high.

Why don’t we call TUV and ask them to audit us I asked? When the ayes came, I rang TUV and asked them whether they would be willing to audit and certify us? They were more than willing to, so we discussed the paperwork, agreed to do it, and asked them for a date. They gave us two days that came after thirteen days from making the call. I accepted and it was confirmed. My Managers were taken by surprise; they did not expect it to be so sudden. “What? Certification audit in less than two weeks?” they asked. They wanted a change

because they thought they had a lot of preparation to do (the impression had come from seeing our neighboring sister company) and also because I was travelling abroad for eight of those thirteen days and would physically not be present. When I told them that I had the confidence in the processes we had set up, that we already had department manuals and the discipline of continuous improvement, they were not convinced but agreed to give it a shot. I had a great Quality Manager whom we picked as the Management Representative who was also a certified auditor. I asked him to do as many internal audits necessary to give everyone the flavor and get us ready. My gut feeling told me that nothing would go wrong, and thus the course to certification was set.

The TUV auditors came and did a very professional audit. Two days of expectations passed by. Finally their verdict; we were the only second company they had certified with zero non-conformance, and applauded us. When you do sincere work with pure intentions, it's easy to trust the work you do. I walk through many factories every month, and see so many certificates plastering the walls like wall paper; while to the Lean eye the inside of the Value Stream tells a different story. And I tell all of them going Lean is far better than getting any certificate of excellence they can pin on their walls. When the Japanese came to our factory they showed little interest in any of our certifications, but watched intensely all our processes and the results they produced. Having worked on becoming Lean, having seen the improved processes take root, the people motivation and their involvement levels go up, I knew our practices were better, more encompassing and inclusive than any certification asked; that's how I knew then the ISO certification was a done deal.

> TO SUCCEED WITH LEAN TRANSFORMATION

Succeeding with the Lean implementation and Lean transformation is not so much about the tools, but it is more about building the culture that will make use of both the Lean Thinking and the tools to remove wastes, keep improvising and learning continuously. So to share with you a few of the secrets I learnt along the way are:

- Stay committed (100%) to the Lean implementation always / everyday. If leadership commitment is not there Lean will not succeed. Period.
- Once the implementation starts leadership must lead the execution. There should never be lack of leadership in the execution phase.
- Lead by example, which is by doing and not by merely speaking instructions.
- ‘Lead, do not delegate’ is a success mantra. This means stay in-charge and do not let go of the controls on implementation so that no variations are created which may slowdown or spoil the process.
- Build trust that the leadership team can lead the Lean implementation, so that others engage in the process.
- Senior levels must show the Lower levels that they are sold out to the concept and its implementation, only then duplication happens.
- Keep modifying the organisation to one of continuous learning.
- Make Lean decisions and guide the organisation on a day to day basis. The structure must also reflect this in effectiveness.
- Leadership must understand the broad concepts and learning required to develop the culture of removing Wastes and continuous improvement.

- Do not fail to be completely involved and supporting in the process. Don't look merely involved but not committed.
- Until the senior leadership is really committed you can only expect minimal or no improvement, and no cultural change.
- Is your Lean a project initiative a strategic one? Lean is not a project. It's a process of gaining competitive advantage by adapting Lean as a company strategy (vision).
- Make Lean your management philosophy to succeed on this journey, and don't look at it as a mere set of tools. Instead focus on improving the management process.
- Motivate people to work with belief in success.
- Develop good Lean Thinking at all levels.
- Your success lies in transforming the thinking of the people within.
- Change the behaviour of the organisation, make Lean your DNA – have everyone understand the value of making problems visible and solving the root causes.
- Today's Production first, tomorrow's Lean later mentality will not help you to succeed.
- Align company policies with Lean.
- Always see business as a whole (Value Stream), do not merely take a department view.
- Lean is not about tools and techniques, these are just means to an end. Teach people to recognise and remove waste (practice it). Build this work ethic to succeed.
- Put in relentless daily Lean work.
- You must have the willingness to really attempt to change Vs going through the motions as taught or instructed.
- Being receptive to change and open minded alone will help.
- This is a human process and patience is a virtue. Focus on the process and not the time. The right process will bring the right results.
- Be pragmatic and not dogmatic about Lean?

- Don't always fire fight, instead have time to think and apply acquired Lean knowledge
- Traditional accounting methods (standard costing, overhead allocation) are ineffective in promoting Lean practices, because they encourage behaviour that is opposite to those needed.
- Make sure that there is total communication and collaboration between impacted areas.
- Creating a good culture and being a good facilitator for Lean initiatives is important.
- Do not run Lean as a parallel activity to daily operations.
- Create Lean awareness amongst all members.
- Transfer knowledge to all new comers.
- Know this; Forecasts and MRP drive schedules based on PUSH encouraging over-Production and inventory Vs Lean that focuses on Production based on true customer demand.
- Product development has a very big impact on costs where almost 80+% of life cycle costs are committed during design process (Traditional process Vs Target Costing and Concurrent Engineering)
- Going Lean is easy. Do not make it hard on yourself.

> CONCLUSION

This is the true story of how Mysore Kirloskar was turned around from a near BIFR (Board for Industrial and Financial Reconstruction) case in 1993 to becoming the market leader and a dominant player. Cosmetic changes and accountant's ideas of cost cutting don't create turnaround successes like this, whereas redoing the business process

with a Lean mindset like this does. One of the key reasons for our successes was due to the respect with which we treated our people – customers, suppliers and employees. We trained and challenged our employees and suppliers to grow and add value. I did not focus on the tools as much as I did on building the culture that would use the tools when and where required. Personally to me the challenge was immense, as it was my job to succeed. I credit our success also to my MD who gave us the latitude and stood by us through the short term aberrations, kept my detractors away and let me have the last word. And secondly to my team of Managers each one of who demonstrated great attitude; excellent competence; and in many ways were better at what they did than I. What I had to do was change my thinking; learn about Just-in-Time and teach how to think Lean and eliminate waste or prevent waste from creeping in, redo all of the business process and reset every micro process the way it would support the Lean initiative, thus charting the course; create the environment; recognise people's achievements; provide encouragement, support and motivation, and most importantly keep all possible interruptions to the Lean process away. Build trust among teams, encourage healthy conflict, develop everyone's focus on commitment, results and teamwork. I must credit the workmen who embraced the change without resistance, demonstrated their participation by drawing maps that guided our layout changes, the innumerable number of problems they solved removing wastes in teams of quality circles. What was also important to our success was my staying laser beam focused on our goals, and letting my body language do the talking.

“What great things would you attempt if you knew you would not fail?” “You will never know what you can accomplish until you make an attempt.” “Ordinary

people believe in what's possible. Extraordinary people visualize what is impossible and make it possible.”
 “There are two kinds of people; those who work and

S. No.	PERFORMANCE INDEX	BEFORE	AFTER THREE YEARS
1	Through put times	30 – 45 days	2 – 3.5 days (2 shift)
2	Lead times of major components	45 – 60 days	1 – 2 days
3	Cumulative quality index (rejection + rework + AOD)	Above 30 percent	0.3 percent
4	Customer satisfaction index	44 percent	96 percent
5	Inventory turns	1.5 percent	17.5 percent for running products (12 percent including dead inventory)
6	Product offerings	4	13
7	Models offered	5	Over 30
8	Market reach (distribution outlets)	12	67
9	Manpower	850	640
10	Increase in Sales turnover	Best previous	500 percent increase
11	Surplus revenue generation	1	15 + times
12	Overall Cost reduction	Nil	60 percent
13	Enterprise Value	X	> 10 X
14	ERE as a percentage to Sales	26	Six (6) and coming down
15	Motivation	Low to Average	High - Excellent
16	Lead time for new product development	Six months for one product	100 days; design board to market for 27 models!
17	Floor space saved	None	33 percent or one third

those who take credit, belong to the first type as there is much less competition there.” “When there is pleasure in the job, it puts perfection in the work.”

ABOUT THE AUTHOR

Sanjeev Baitmangalkar, the then Vice President and the SBU Head of The Mysore Kirloskar Ltd., was instrumental in planning and executing the turnaround strategy for Mysore Kirloskar during the 1990's. Known for his Leadership qualities and skills in Marketing and Manufacturing, he personally led this transformation successfully hands on. He was also the Director & CEO at Texmaco Group in South East Asia, and was the Managing Director of Roots Multiclean Ltd (a JV Company with Hako Werke of Germany). He is an accredited Lean Consultant with MSME and QCI and an invited Consultant on the Prime Minister's program of improving the global competitiveness among the Indian SME's and an invited speaker on Lean Management at International Seminars, Corporate programs, Business and Engineering Colleges. With many firsts to his credit in Manufacturing and Industrial Marketing, he also has many publications on the subjects of Lean Manufacturing, Leadership, Core Competence, Differentiation, Team Work, Strategy, Case Studies, Ethics etc. Today he assists companies in India and abroad on their journey from discrete to becoming Lean.

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