Mantras for manufacturing excellence

Go lean!

Process improvement is a way of life for many successful manufacturing companies. If you want to stay in business, make sustainable profits and participate in the great game of business, you must consistently produce the highest value products and services at the lowest possible process costs, while always meeting the changing requirements of your customers.

Sanjeev Baitmangalkar is the CEO of Stratmann Consulting, a management and strategy consulting company. He has worked as director & CEO with the Texmaco Group in South East Asia, and as the VP & SBU Head with the Kirloskar Group in India.

Every organisation wants to be flexible enough to adjust quickly to changing market conditions, lean enough to beat any competitor's price, innovative enough to keep its products and services technologically fresh, and dedicated enough to deliver maximum quality and customer service.

So if managements want companies that are mean, nimble, flexible, responsive, competitive, innovative, efficient, customer focused and profitable, why are so many businesses bloated, clumsy, rigid, sluggish, noncompetitive, uncreative, inefficient, disdainful of customer needs, and loosing money? The answer lies in how these companies do their work and why they do it that way. The results that companies achieve are often very different from the results that their managements desire.

Good thinking

Benjamin Disraeli the great philosopher once said: "Nurture great thoughts, for you will never go higher than your thoughts". Look at all the successful people in the world, what do they have in common? What is that one thing that separates those who go to the top and those who never get there? 'It's good thinking'. If you are willing to change your thinking, you can change

your feelings. If you can change your feelings, you can change your actions. And by changing your actions - based on good thinking - you can change your life.

All of us want our children to be educated in the best schools and colleges. I am not undermining the importance of good education. But the problem with most educational institutions is that they try to teach people 'what' to think, and not 'how' to think. "Knowledge is power," said Francis Bacon. But knowledge has

value only in the hands of someone who has the ability to think well. We must learn how to think well and reach our potential. In the same way, organisations must learn how to think well and reach their potential.

Big idea

Why should you embrace the value of good thinking? David Schwartz, Professor of Georgia State University and the author of 'The Magic of Thinking Big', has this to say: "Where success is concerned, people are not measured in inches or pounds or college degrees or family background; they are measured by the size of their thinking". Becoming a better thinker is worth your effort because the way you think really impacts every aspect of your life. It doesn't matter who or what you are, good thinking will make you better.

Better result

Good thinking creates the foundation for good results. Remember James Allen's words... "Good thinking can never produce bad results; bad thoughts and actions can never produce good results". You understand this in the natural world, but try to understand this in the mental and moral world, and cooperate with it. You all know that poor thinking can produce only negative results, average thinking produces no result, and good thinking produces some progress but great thinking produces great progress. You cannot change your results without changing your thinking. Remember the proverb 'as you sow, so you reap'? If you need great results, you need to sow great thinking. Why do you think you fall short of achieving your complete dreams? It's because you are trying to change your results without changing your thinking. The best way to develop good thinking is by surrounding yourself with it. How? By reading positive attitude books, listening to positive thinking tapes and being amongst people who have developed the ability to think positive.

Hiking potential

Each of us is a leader in some way, be it to our family, to our business, in our community, in our social environment, in our profession, etc. For achieving manufacturing excellence, you lead by the way you think, for, your thoughts will lead to actions. You will become as small as your controlling desire or as great as your dominant aspiration. You are that person as you think in your heart. Our leadership ability determines our level of effectiveness. The ceiling on your leadership ability is low if you are a poor thinker and that ceiling is high if you are a great thinker.

Good habits

Good thinking produces more good thinking if you make it a habit. The problems we face today cannot be solved by thinking in the same way we thought while creating them. If you think about excellence, you are bound to produce more of that good thinking. Look around you the world keeps getting more complicated. It doesn't have to discourage you. Instead, you can try and decipher this...

I am your greatest companion. I am your greatest helper or heaviest burden. I will push you onward or drag you down to failure. I am completely at your command. Half of the things you do you might as well just turn over to me and I will be able to do them quickly and correctly. I am easily managed - you must merely be firm with me. Show me exactly how you want some thing done and after a few lessons I will do it automatically.

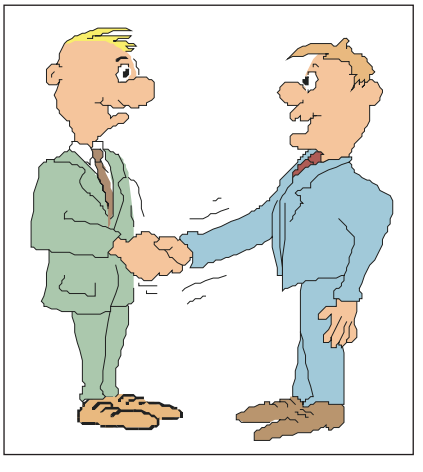
I am the servant of all great men; and alas, of all failures as well. Those who are great, I have made great. Those who are failures, I have made failures. I am not a machine, though I work with all the precision of a machine plus the intelligence of a man. You may run me for profit or run me for ruin - it makes no difference to me. Take me, train me, be firm with me, and I will place the world at your feet. Be easy with me and I will destroy you. Who am I? I am habit!

The good news here is that no matter how complicated life gets or how difficult problems may seem, good thinking can make a difference and move you towards excellence - if you make it a consistent part of your life.

Doing things differently

Success comes to those who habitually do things that unsuccessful people don't do. The more you engage in good thinking, the better your thoughts become. It's like creating an army of good ideas capable of achieving almost anything - continuous improvement. Every one of you has the potential to become a good thinker. Remember, unsuccessful people focus their thinking on survival, average people focus their thinking on maintenance, and successful people focus their thinking on progress. What will you focus your thinking on?

What then can be good thinking in manufacturing? What is the 'how to' think agenda or Mantras for



Manufacturing Excellence? "Don't wish it was easier, wish you were better. Don't wish for less problems, wish for more skills. Don't wish for less challenges, wish for more wisdom," says Jim Rohn.

Know the customer

The dominant force in the seller-customer relationship has changed since the 80s. We are no longer in the sellers market. Sellers no longer have the upper hand; customers do. Customers now tell suppliers what they want, when they want, how they want it, and what they will pay. This new situation is unsettling to companies that have known life only in either the mass market or protected environment. In reality, mass market never existed, but the idea provided manufacturers with useful fiction that their customers were more or less alike. Mass-market suppliers in India had few competitors; they offered very similar products and services. Customers were not dissatisfied. They didn't know there was something better. Examples: Bajaj Auto until Honda and Yamaha came along; Premier Automobiles and Hindustan Motors until Suzuki and the others came along.

Now that they have choices, customers do not behave as if they are cast in the same mould. They demand products designed for their unique and particular needs. The notion of 'the' customer has been replaced by 'this' customer. The one with whom the seller is dealing at this moment is the person who now has the capacity to indulge in his personal tastes. The mass market has broken into pieces, some as small as a single customer. The balance of market power has shifted from the producer to the customer.

Reduce work in process

HP in Colorado cut work in progress (WIP) from 22 days to one day. Remember the JIT goal is 'add value, not cost'. Counting, moving, storing material, searching, de-containerising, accumulating, and

inspecting employ a lot of people and resources because of legal and financial reporting. The task of material movers, stock keepers, material clerks, expediters, and data processing support people is a negative one. Their task of managing the waste, delays, and errors in the system depends on failure to make what is needed on time. These activities add to costs and not value. Available simplified tracking methods can be used instead.

Reduce lead times

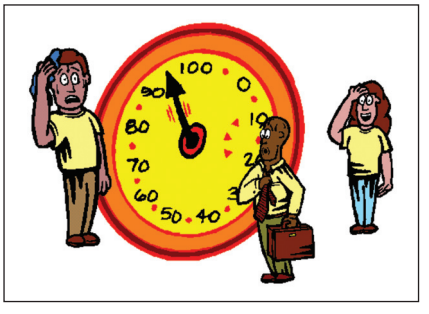
There are many believers in the zero defect goal who remain unruffled irrespective of whether or not it is achieved. The number of believers in zero lead time as a super ordinate target is small but growing fast. Lead-time reduction is a true and reliable dominant measure of efficiency, because a plant can only reduce it by solving problems that cause delays. Lead times drop fast when problems are solved fast. As Albert Einstein said, "You can't solve a problem on the same level that it was created. You have to rise above it to the next level".

Cut set-up and changeover time

How do you see the set-up time? Does skill lie in the set-up or in simplifying the set-up? Are set-up technicians and engineers needed, or operators who lead the projects, with technicians and engineers to help them? Should the operator watch the machine run or should operation be a well-timed routine while the operator is busy thinking about the next improvement? Are assembly jobs simplified so that unskilled labour can perform them or because assemblers can acquire multiple job skills, data collection duty, diagnosis and problem solving talents? These days the most important type of work-study is change over and set-up time reduction. I was in the office of the executive director of a tier-one Maruti supplier in Gurgaon. It was around 10 o'clock. His telephone rang. He picked it up, listened, and said "Yes, will do". I asked him curiously and he said, "Maruti needs a different steering assembly to the one now being run". He then picked up another phone and barked his instructions... "They want the B assembly today. The first pick up will arrive at 1400 hours". Sure enough the plant changed its settings on machines and assembly stations, produced, and delivered the first shipment at 1400 hrs that day. Wow! This was achieved only by reducing set-up and changeover times. Changeover times are a measure of your flexibility and efficiency.

Reduce flow distance and space

Sperry in Minneapolis made whole computer, PCB assembly (one piece lots, no units between stations), computer assembly, tested and packed in one small room. When the shop is small, the production is usually fast. But who wants to stay small? Everybody wants to grow. Growth is not the problem. Problem is more-of-the-same approach to growth. Growth must be accompanied by a transformation to preserve speed, to avoid stop-and-go production. What tools and techniques make shop transformation possible? At the top of the list are a set known as just-



in-time techniques. The dominant precepts for correcting imperfect flows are.

Reduce through-put time

Increase make-delivery frequency for every item - A WCM precept is to produce some of every type everyday and in the quantities sold that day. If a WCM effort fails to make it easier for marketing to sell the product, then something is wrong. At MKL in Hubli where they strictly produced to orders, some machines had to be produced as one piece or one number only. They had evolved a methodology to produce one as fast as they produced a batch by the use of JIT techniques. Even where they had continuous orders, their production was on an everyday mix of models to be delivered to customers. They achieved this by shortening the batch sizes and short make-delivery times. As William J Bennett has said, "Give yourself an even greater challenge than the one you are trying to master and you will develop the powers necessary to overcome the original difficulty".

Focus on a few good suppliers

Xerox Reprographics reduced suppliers from 5,000 to 300. GM in Canada sole sourced 99 per cent of components. Twin City Disc reduced suppliers from 900 to 250. MKL in Hubli reduced supplier numbers from 178 to 33 no. IBM TW Division reduced suppliers from 640 to 32. Stories like these sure strike fear in the hearts of suppliers. Would this mean that a large number of supplier companies bite the dust? Surely not. If supplier reduction runs its course then the results should be: a typical supplier plant sells in much larger volume to much smaller number of customers than before. Long-term contracts replace short-term purchases. Supplier receives training, advance planning information, and some times even financial assistance. Some of the contracts may provide for delivering to a daily rate rather than irregular demands. Buyer takes over making the freight arrangement. Remember Maruti sent its truck to Sona. Supplier development means treating the supplier like family. The rationale for supplier development is quality goes up and price goes down. Too many suppliers mean too little attention to each of them; supplier development starts with supplier reduction.

Standardise and rationalise

Cut number of part numbers. Perhaps the best-known example comes from the MKL Hubli case study. They battled 15,000 part numbers to configure five basic models. This was a huge challenge given the conventional shop and they had to produce one if only one was required. During the re-engineering process, they developed modular machines, applied a great degree of standardisation and rationalisation. They eventually produced 27 models (different configurations) with a basket of parts that had 800 manufactured components and less than 600 bought-outs. They did this by putting together an effective marketing-design-manufacturing team. Xerox had done something similar. The buying company should not be motivated by benevolence, instead, contractual agreements should be tough so as to drive the supplier into a mode of continual and rapid improvement.

Make product manufacturing easy

The designs should be so made that the manufacturing process can control the process variations with available equipment. There is always the argument of adding equipment for processes required. The organiation must take a balanced view on the cost effectiveness.

Eliminate search time

I am called in to many factories to talk about waste elimination. Quite often when I stand on the work place to analyse the environment, I have found that workmen search for something and consequently end up loosing time. Sometimes the CNC machines part programme or the parts manufacturing process may not be optimised. I was called in to do a BPR at a client's factory recently. Among the many things that required change were arranging the work place to eliminate idle movements and search time; correct 80 per cent of the steps in manufacturing processes and correcting part programmes to increase productive time. Eliminating the search time will reduce the through-put time and improve the output.

> The smaller the lot size the better (JIT principle); do it right the first time (TQC principle); and maintain the equipment so often and so thoroughly that it hardly ever breaks down or mis-performs during a production run (TPM).

Cross train and multi-skill

At one of the factories where we implemented these principles, the set-up was that the work force was trained such that each operator worked on one machine under the banner of 'skill'. When the shop floor was relayed in smaller manufacturing cells and on a flow-line concept, the focus on production was to 'produce to daily dispatch rate' and not to either a forecast or inventory. The number of man hours required per day to produce the daily rate defined the need for an operator. So, every

operator was trained to operate at least three machines, one before and one after his machine - the one-up-one-down concept. Multi-skilling the workforce builds flexibility, optimises numbers of the workforce, overcomes line stoppages for want of an operator, and improves operation efficiency.

Retain production and problem data

We were recently invited to re-engineer an ongoing business, a business that was doing well in terms of demand, turnover, and perhaps profits. People with limited exposure and experience had set up the manufacturing practices. Yet, the place was buoyant with activity serving export markets. When I walked in and saw the place, I called it God's miracle, for it had everything (the entrepreneurial zeal and zest, a big dream, a clear and distinct vision, a hurry to move forward, desire to become a global organisation, tremendous ability to sell in competitive overseas markets, et al) and yet, it had nothing (no documented data of any kind, no master processes, no quality history, no disciplined operating systems, procedures and practices, etc.) The absence of this data has not only left the organisation devoid of learning, but the organisation now has to go through the process of overcoming the resistance to change, because people have to move out of their comfort zones. Although some people are highly committed to achieving the targets, life is a struggle even at the end of a 12-14 hour working day and the employees lose out on vital family time, too. Recording and maintaining data on production, quality and problems helps to measure rate of improvement, helps in identifying the areas that need to be improved upon, learn from past actions and results, take corrective actions but avoid pitfalls, identify training needs and areas where skill needs to be upgraded, to improve processes, etc.

Crack the problem at the origin

'Nip it in the bud'; 'Get down to the grass root level'. We have all heard of these suggestions. A problem is best solved at the place it originates. The data, information and feel are best available at the line level, unless there is a different technology needed to solve problems. Data can be best collected at the functional level - from operators and line supervisors. For example; if you have a defect or process deviation on the shop floor, that is where the problem must be solved and by those very people. Don't try to do it elsewhere. Building a quality circles is a practice used to achieve this. This acts as a motivator as well.

Improve existing systems

When qualitative and productivity improvements have to be achieved, some organisations think of investment as a route. Sure, you may have to invest based on an assessed need. But you should first give your best shot at improving your existing equipment using preventive maintenance techniques or even productive maintenance techniques. It is necessary to imbibe a sense of appreciation and commitment while training and retraining the work force. If they understand the 'why', they will implement the 'how' that you will coach them to do.

Look for simple, movable equipment

Some say that equipment decisions should be based on variability and volumes. Others are of the opinion that the equipment should meet daily rate of requirement. Today's technology can give you a great degree of sophistication, if your process and part design requires it. Small batch producers find the flexible and easy-to-set-up, stand-alone CNC machines a boon. Continuous manufacturers still find simple dedicated machines cost effective. The process of continuous improvement also involves frequent layout changes. So having machines that can be easily moved around in case of layout changes is a huge advantage.

Have multiple workstations

During the 1980s, MKL looked at building a moving assembly line for machines. At that time the factory practiced 'group technology' as its manufacturing strategy. This involved balancing all the background work, and since they produced more conventional machines during that time, they had to balance a lot of cycle times. When the company implemented lean manufacturing in the very early 90s, the question that emerged out of JIT and Kaizen learning was different. Do we need a moving line or do we need a faster workstation? What impact will both have on the floor space? They worked to drastically cut down lead times and cycle times. They had to ship six machines every day - a mixture of different models. They built eleven workstations that would churn out assembled machines to match this daily rate. It took about one-third of the space that the line would have taken. Balancing the cycle times, they set up multiple workstations where required. At ANZ, where they need to ship 250 deck hub assemblies every day, they have set up multiple work stations to balance a three-minute cycle time.

Automate incrementally

At ANZ, they produced spindle bolts in over 15 operations. Eight types of problems confronted them, necessitating extra corrective operations and the pains of rejections, process variations, deviations, non-conformances, and delays. Using problem-solving techniques, they identified that by automating the process they would finish the part in just a few operations, and eliminate the process variability to clear the eight problems once and for all. Instead of rushing into buying the most suited automated equipment, they have incrementally automated with available equipment to bring all variables under process control. So, automate incrementally to control process variability; and this way you will also keep costs under control.