



National Institution for Quality & Reliability

Chennai Branch

Quality Month Knowledge Titbits

11 Nov 2022

Feather 11

India's success in Space Technology – A Quality Perspective

Shri C. Athi Pagavan, Chairman, NIQR Trivandrum Branch

The success of Indian Space Programme is a hard-earned sustainable achievement. Decades ago, we used to depend on foreign countries to put our satellites in Space. Now, we are self-sustained and the situation has reversed; foreign countries seek our help to put their Satellites in Space. In Space Technology, the demarcation line between success and failure is very very narrow. One has to dive deep into the system details to pinpoint Accept or Reject criteria. The Quality Engineer plays a critical role in the success of every flight. The success formula can be broadly covered under the following ten categories.

- Thorough Review of the Design concepts and Design.
- Analysis of the design Assumptions and Presumptions.
- Critical Review of the Development Process and Production.
- Selection of the right Qualified Vendors.
- Draw out Quality Plan during Development and Production and implement it strictly.
- Prediction of the Reliability of the Product/System
- Validation of Reliability through extensive Test & Evaluation.
- Systematic Audit of Quality and Reliability at all stages.
- Development of Human Skills continuously.
- The Quality Engineer acts as a catalyst to ensure Quality & Reliability at every phase of Production and System realization.

It can be confidently said that ISRO is following the theme "**Quality Conscience: Doing the Right thing**" in the true spirit.

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10 Nov 2022

Feather 10

கடன் வாங்கலாமா? கூடாதா?

Dr Somavalliappan, Writer, Speaker, Trainer - HR, Finance, Management

'கடனா? வேண்டவேண்டாம். கூடவே கூடாது'. என்பார்கள் சிலர். கடன் வாங்கவே கூடாதா?

பதில் கடன் எதற்கு வாங்குகிறோம் என்பதைப் பொறுத்தது. மாத வருமானம் 20,000. வீட்டுச் செலவுகளுக்குப் பயன்படுத்துகிறார். இப்படிப்பட்ட கடன்களை கண்டிப்பாக தவிர்க்க வேண்டும். வருமானம் இவ்வளவுத்தான் என்று உறுதியாக தெரிந்த பின்னரும் ஏன் கூடுதல் செலவு? இதன் மூலம் வருங்கால சூழலை அதிகரிக்கிறது.

அன்றாட செலவுகளுக்கு கடன் என்பது, அது தனி நபரோ குடும்பமோ, நிறுவனமோ சிக்கல்தான். வருமானத்திற்குள் செலவைக் கட்டுப்படுத்தியே ஆகவேண்டும்.

மாறாக, கடன் முதலீடு செய்வதற்கு என்றால் அது சரி. கடன் வாங்கி பிள்ளைகளைப் படிக்க வைக்கலாம். கடன் வாங்கி வீடு கட்டி, வாடகைக்கு விடலாம். கடன் வாங்கி நிறுவனத்தின் வியாபாரத்தை பெருக்கலாம்.

கடன் பணம் விதை நெல் போல, தூண்டிலில் மாட்டுகிற புழுவைப் போல. போடுவதைப் போல பலமடங்கு கொடுக்கும். கொண்டுவரும்.

வசதியில்லை, பணமில்லை என்கிற காரணங்களால் படிப்பைத் தவிர்க்கக் கூடாது. நன்றாகப் படித்து வேலைக்குப் போய் சம்பாதிக்க ஆரம்பித்தால், கடன் ஓரிரு ஆண்டுகளில் முடிந்துவிடும். அதன்பிறகு ஓய்வு பெறுகிறவரை கிடைக்கிற வருமானம் கடனைப் போல பலமடங்குகளாக இருக்கும்.

ஆக, வியாபார வாய்ப்பு இருக்கிறது என்றால், துணிந்து கடன் வாங்கலாம். ஒருவருக்கு அவர் செய்கிற வியாபாரத்தில் லட்ச ரூபாய் முதலுக்கு இருபதாயிரம் ரூபாய் லாபம் கிடைக்கிறது என்று வைத்துக்கொள்ளுவோம். இன்னும் எத்தனை லட்சம் போட்டாலும் அதே போல 20% லாபம் கிடைக்கும் என்று அவருக்குத் தெரிகிறது. ஆனால் மேலும் முதலீடு செய்வதற்கு அவரிடம் பணம் இல்லை. அவர் என்ன செய்யலாம்?

அடமானம் வைக்க வேண்டி வந்தாலும் வைத்து, கடன் வாங்கலாம்.

கடனுக்கு பயந்தவர்கள் இழக்கிறார்கள். துணிந்தவர்கள் ஈட்டுகிறார்கள். ஒரே வியாபாரத்தில் இருக்கும் இரண்டு வெவ்வேறு நபர்களில் ஒருவர் கடன் வாங்காமல் லட்ச ரூபாய் முதலீடு செய்து 20 ஆயிரம் லாபம் செய்கிறார். கடன் வாங்கிய ஒருவர் அதே லட்ச ரூபாய் முதலீட்டிற்கு (20+21), 41 ஆயிரம் ரூபாய் லாபம் பார்க்கிறார்.

இரண்டாமவருக்கு கொஞ்சம் ரிஸ்க் இருக்கிறதுதான். அவர் அவருடைய லட்ச ரூபாய் முதலீட்டை மூன்று மடங்கு லீவரேஜ் செய்திருக்கிறார். லீவரேஜ் என்பது நெம்புகோல் போல. சின்னத் தள்ளல், பெரிய பலன். மிக அதிகமான லீவரேஜ்தான் பிரச்சனை. ஓரளவு என்பது தேவையானதே.

வாய்ப்பிருக்கும் படிப்புகளுக்கு, தொழில் கற்றுக்கொள்வதற்கு, வியாபாரப் பெருக்கத்திற்கு போன்ற காரணங்களுக்கு கடன் வாங்கலாம். வாங்கவிட்டால்தான் தவறு.



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Quality Month Knowledge Titbits

09 Nov 2022

Feather 09

Importance of Quality and Reliability in Business

Mr. Susanta Kumar Das, Retd - Head Quality Nalanda-BEL Academy for Excellence, Bangalore
ASQ CSSBB, CQE, CRE, CMQ/OE, RMC-ASQ USA, PMP-PMI USA

The other day, one of my childhood friends asked me how quality can be more important than cost. As per him, "As quality improves, cost increases. The companies can make mediocre quality products at lower cost, sell them at lower price, and become successful." This concept of quality and cost is erroneous, if we consider quality of conformance. The cost of products and services with high quality of design may be higher as they are manufactured with higher specification or a greater number of features. However, the cost of manufacturing a good quality product or service at a stated specification is much lower because of smaller process variation resulting in no rejection, or lower rejection or rework rate. This will lead to reduced manufacturing cost, hence lower price. All enlightened companies understand this relationship, and constantly improve the quality of their products and services, offer them to their customers at lower price, and thrive in the market with higher customer satisfaction.

So, my answer to my friend was, "if we improve quality of conformance, cost can be reduced, and thereby, the price can be effectively reduced."

In the domain of quality, reliability is a very important concept. Customers attach much value to products and services that are reliable. Reliability is a dynamic property of quality. Unlike quality, which is a static measure, reliability is a dynamic measure, i.e., a measure of how a product or service performs its intended function at a stated level of performance over time.

Reliability of products and services will ensure repeat order from the customer or referral to new customers. A product or service that is reliable, is not only sought after by customers, it also ensures safety and helps protect the environment. The present demand is to design high reliable products and systems, specifically, for critical applications like defense, space, avionics, healthcare, and so on where failures have serious consequences.

The companies need to put efforts to improve quality and reliability on a continuous basis not only for business sustenance but also for human welfare. The product and service designers have a greater role to ensure high reliability of their designed products and services. For new innovative products, reliability is a very critical parameter, as unreliable products will lose the competitive edge in the market. The scientists and engineers are constantly looking for newer technologies, materials, and design techniques that improve capabilities for the devices, components, and systems to achieve high quality and reliability.



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Quality Month Knowledge Titbits

08 Nov 2022

Feather 8

Quality and Innovation – For Students

Dr V Swaminathan, Senior National Vice President, NIQR

The focus today in India is on the “Yuva Shakti” or youth power. The more effectively we harness this enormous power, greater will be our glory. This puts a huge responsibility on the youth primarily and on the mentors too. NIQR Student Chapters will bring out the Creative and Quality aspirations of the young people. Any change has three aspects, improvement, innovation and invention. Whereas Improvement is doing things better, Innovation is doing things differently (out of the box thinking) and Invention is totally new way of doing things (out of the world so to say).

Improvement is also called Kaizens or continuous improvement, and this is what is encouraged in many industries at all levels. It is interesting to note that some of the best suggestions for improvement have come from shop floor workers and this has transformed the work culture in many industries. This is particularly so after the advent of foreign companies especially Japanese and Korean auto companies. Kaizen is part of TQM and TPM cultures and this is highlighted in many kaizen conventions held all over the country. The common sense plays a very big part in improvement work and common sense. I would even say that common sense is inversely proportional to education. This is our experience in the industry. Any kind of improvement activity has to be inculcated from young age and that way this will go a long way to create “scientific temper” to improve and innovate.

There are millions of examples how mankind has taken advantage of the innovative spirit inherent in us to enrich our lives. If you look at the history of innovations from time immemorial, we are surprised to see that modern man, who appeared nearly 70,000 years ago, has never accepted the status quo and is always looking for ways and means to change things for the better. If you take agriculture, from raw implements to present day tractors and harvesters, things have changed beyond recognition. This story can be repeated in all sectors.

Regarding inventions, mankind has done its proud through the various inventions through history. What is amazing is that many scientific inventions have taken place in the last 3 or 4 centuries and we are left wondering how mankind managed from the dawn of history. The modern car, the electric bulb, the gramophone, the telephone, the movies, the aircraft, the nuclear energy, the computer and last but not the least the cell phone have all made their entry only in the last two centuries. It makes us wonder.

In this endeavor, it is worth remembering three steps to succeed. 1) Sankalpa-desire- that is the desire to do the improvement or innovation. This should be very strong. 2) Prayathna-Effort- You should be prepared to go to any length to do everything that is required to achieve your goal. Do not forget what Swami Vivekananda has said, “Arise, Awake and Stop not till the goal is reached”. 3) Anugraha- Divine Blessing- this could be from your parents, your teachers, your employer or from your well-wishers. When all the three are in fine synergy, success is assured. Improvement and innovation go hand in hand in any organization. By adopting good quality tools and techniques, we enhance the quality of the results. Our ultimate goal to delight the customer will be amply served. I once again wish the students all the best and would urge all of you to maintain this scientific temper throughout your life so that you not only enrich yourselves but also make this society a better place to live.



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07 Nov 2022

Feather 07

விரிவே வாழ்க்கை, சுருக்கமே இறப்பு

(Expansion is Life, Contraction is Death)

Shri P Kothandaraman, Chief Executive, TRAINCONST

எனது கல்லூரி பருவ நாட்களில் ராமகிருஷ்ணா மிஷன் தொழில் நுட்ப கல்லூரியில் டிப்ளமோ மூன்றாவது வருடத்தில் நான் இலக்கிய மன்ற செயலாளராக இருந்த பொழுது, இந்த தலைப்பு தமிழ் கட்டுரை (Essay Competition) போட்டிக்காக அறிவுப்பு பலகையில் வெளியிடப்பட்டவுடன் இதை பார்த்த மற்ற மாணவர்கள் அனைவரும் இந்த தலைப்பை செயலாளர் ஸ்வாமிஜி அவர்களும் கோதண்டராமனும் தான் எழுத வேண்டும் அவர்களுக்கே பரிசு வழங்கப்படும் என்று கேலி செய்தனர்.

பின்னர் செயலாளர் ஸ்வாமிஜி (Rev. Swami Swatmanandaji, then Secretary of the Institute) அவர்கள் அனைவரையும் அழைத்து ஒரு முன்னுரை கொடுத்தார். பிறகு அதே தலைப்பில் எழுதி முதல் பரிசு பெற்றேன் என்பது அந்த வயதிற்கு எனக்கு கிடைத்த பெரும் பரிசு.

நமது மொத்த வாழ்க்கையும் இந்த நன்கு வார்த்தைகளிலே "**விரிவே வாழ்க்கை சுருக்கமே இறப்பு**" என்பதில் அடங்கி இருக்கிறது. நமது மனம் எந்த அளவுக்கு விரிந்து இருக்கிறதோ அந்த அளவு நமது வாழ்க்கை சிறப்பாக அமையும் / அமையப்படும். இராமாயணத்தில் ராமபிரான் குகனிடம் "**நின்னோடும் ஐவரானோம்**" என்கிறார். அப்பேற்பட்ட ராமனே தனது வட்டத்தை விரிவாக்குகின்றார் என்றால் நாம் எம்மாத்திரம். ஏன் பிராணாயாமித்தில் (மூச்சு பயிற்சி) கூட உயிர் வாழ்வதற்கு நமது மூச்சை விரிவாக்கம் செய்கிறோம். எவ்வளக்கெவ்வளவு ஆழ்ந்த மூச்சு விடுகிறோமோ அந்த அளவிற்கு நாம் நீண்டு நெடு காலம் நலமாக வாழ்வோம் என்று சொல்லப்படுகிறது. ஆக உயிரும், நல்ல வாழ்க்கையும் விரிப்போடு தொடர்பு கொண்டிருக்கின்றன. விரிவான சிந்தனை (எண்ணம்), நட்பு, உறவு என பல செயல்கள் நம்மை வாழ வைத்துக்கொண்டிருக்கின்றன என்றே திட்ட வட்டமாக சொல்லலாம்.

நாமும் நல்ல நெறியோடு வாழ்ந்து, மற்றவரையும் மனமார் நம்மால் முடிந்த உபகாரத்தை செய்து வாழ வைப்பதே ஒரு நல்ல விரிவான வாழ்க்கைதான் என்பது என் தனிப்பட்ட கருத்து. மேலும் தொடர்வோம், வாய்ப்பு கிடைக்கும் பொழுது. அனைவருக்கும் நன்றி.



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06 Nov 2022

Feather 6

Advanced Composites for Aerospace Applications

Dr R Ramanarayanan, Ex Scientist, DRDL, Hyderabad

Composite materials generally have high strength and modulus to strength ratio than other engineering materials. These properties can reduce the weight of a system by as much as 15-25%. The weight savings can be transformed into energy savings/increased performance.

Advanced Composites exhibit desirable properties and have high creep resistance and dampening characteristics. The superior fatigue performance of composite materials enables them to be used to repair metallic airframes with fatigue damage. Composite materials can be manufactured in almost any shape; they allow great design flexibility and offer reduced parts count for articles. The opportunity to select the constituents, tailor them to obtain the required properties, and then through design make the optimum use of the properties is a situation that makes composites very attractive to many industries.

The aerospace and military markets are the two areas that have accounted for the largest effort in the development and advancement in composite technology. There have been reductions in the number of parts required to construct some components by using molding, filament winding and compression moulding techniques. New commercial/ military aircrafts use advanced composite materials for structure. Rocket motor casings, nozzles and nose cones are missile applications. Radar domes, rotor blades, propellers and many secondary structure components such as fairings, doors, and access panels are also fabricated from advanced composites.

The use of advanced composite materials will continue to grow. As more engineers come to understand composites, more opportunities will be recognised for their use. Composite materials offer tremendous advantages for tailorability, design flexibility and low-cost processing with low environmental impact. These attributes create a very bright future for advanced composite materials.



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Quality Month Knowledge Titbits

05 Nov 2022

Feather 05

Mistake Proofing / Poke Yoke

Shri P T Bharani Perumal, Chairman, NIQR- Chennai Branch

Mistake Proofing or **Poka-Yoke** is a process analysis tool that either makes it impossible for an error to occur or makes the error immediately obvious once it has occurred.

Why Poke-Yoke is Important:

Even the smallest error in a process can cause large problems down the road. For most businesses, they will impact the bottom line and the ability to fulfill customer requirements. There's also a loss of professionalism when a company does not correct an easily avoidable error

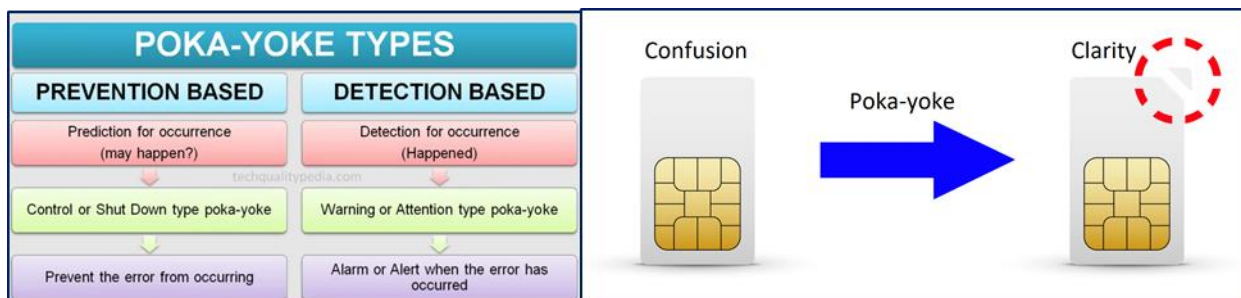
How Poke-Yoke works:

Poka-yoke can work in both proactive and reactive ways. It is most useful when used to ensure that the optimum conditions exist before a process begins, preventing mistakes from happening. However, if defects are already detected, poka-yoke techniques can identify errors and give teams a chance to quickly eliminate them

Putting poka-yoke to work involves following a series of steps. They typically flow as follows, according to the American Society for Quality (ASQ)

- Create a detailed process flow chart of every operation in a process, no matter how small.
- Review each step to determine where human errors are likely to occur – this can involve the 5 Whys.
- Once every potential error is found, work through the process to find the root cause.
- Design solutions in the process to eliminate the risk of the error ever happening. This can include eliminating the step or replacing it with a mistake-proof step.
- If the team cannot eliminate the step that involves the potential error, they can come up with ideas to minimize its impact should an error occur. This can include establishing inspection methods or setting strong parameters on the functions of a step so that errors are easily detected.

Poke-Yoke types & Example





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04 Nov 2022

Feather 4

Daily Work Management

Shri C Sundaravadivelu, Executive Committee Member, NIQR

Introduction to Daily Work Management:

In the world of business, innovation and improvement are popular with many employees, but most Managers tend to underestimate the importance of maintaining the current level of performance. Nevertheless, most of the work in any organisation consists of maintaining everyday activities at current level of performance. People must know that we need the maintenance activity on a day-to-day basis after innovation and improvement are made in TQM. In TQM, we have Policy Management for Innovation and drastic improvement while we have Daily work Management for maintenance and step by step improvement.

Daily Work Management relates to management of activities pertaining to area of responsibility and which are repeated on daily/ routine basis. Word used is daily but even if an activity is repeated once a week, it is still routine and hence covered under daily work management.

What happens if DWM is not practiced?

- Always under pressure for results.
- If output is not levelled, high pressure during month-ends.
- Always firefighting, chasing people & material.
- Long working hours, frustration.
- Physical tiredness, mental tension.

A daily work management system is a set of standard practices that keep improvement efforts on track and moving forward. It is often referred to as the missing link in Lean initiatives and the key to long-term sustainment. A daily work management system is comprised of three elements, leadership routines, visual management, and accountability. Each of these three elements overlap, reflect and build off each other to keep leaders, at all levels, in touch with how things are going. How well are these three elements woven into the fabric of your operational governance.



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Quality Month Knowledge Titbits

03 Nov 2022

Feather 3

Lean Manufacturing Practices - LSMEs

Dr V Swaminathan, Senior National Vice President, NIQR

Lean manufacturing is a methodology that focuses on minimizing waste within manufacturing systems while simultaneously maximizing productivity. Waste is seen as anything that customers do not believe adds value and are not willing to pay for.

In simple "Lean means manufacturing without waste".

The Lean Concepts have taken a refined shape since 1913 with Henry Ford's flow with no flexibility through Frederick Taylor's, Frank Gilbert's further development.

Over the years, Lean Experts like Toyoda, Taiichi Ohno and Quality Gurus like Deming, Juran, Feigenbaum, Ishikawa, Taguchi, Crosby, Shingo and Hirano have added TQM, WCM, SPC, DOE, PDCA, PY, Jidoka & JIT and SMED techniques as part of Lean.

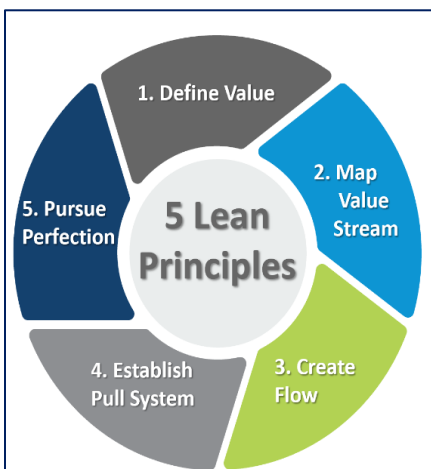
Type of wastes



7 Steps of Lean

Steps	Measures
Step 1 : Value stream mapping <i>Mapping the process flow for a product / product family</i>	Process ratio in percentage
Step 2 : Create flow <i>Layout changes</i>	Single piece flow
Step 3 : Balance to takt time <i>Match the pace of production to the pace of sales</i>	Ratio between cell bottleneck time and takt time
Step 4 : Stabilise the Production <i>Loss elimination through TPM</i>	OLE of the cell
Step 5 : Improve flow <i>Paced withdrawal, PULL system</i>	Percentage of missed cards per shift
Step 6 : Zero defect	PPM
Step 7 : Levelled production	Every part every day/ Every shift/Every hour

Lean Principles



Benefits of Lean

Increased product quality: Improved efficiency frees up employees and resources for innovation and quality control.

Improved lead times: Streamlined , businesses processes can do better to fluctuations in demand and other market variables, resulting better lead times

Sustainability: Less waste and better adaptability makes for a business that's better equipped to thrive well.

Employee satisfaction: Workers know when their daily routine is bloated or packed with unnecessary work, and it negatively affects morale.

Increased profits: More productivity with less waste and better quality ultimately makes more profit.



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02 Nov 2022

Feather 2

5S is the foundation for all improvement activities

Shri S Murugan, Vice Chairman, NIQR Chennai Branch

5S is one of the best Japanese Concept of Workplace Management which is the foundation for any improvement activities

Generally, it will be named as "Housekeeping"; but it is not so.

It is a waste elimination and value adding tool to improve our PQCDMS

Set of Five Japanese words starting with the letter S is called 5S

SEIRI, SEITON, SEISO, SEIKETSU & SHITSUKE

SEIRI - Removal of unwanted items from the workplace and removal of unwanted activities from our process also

Key benefits: space saving, NVA elimination resulting in Cost

SEITON - A Place for Everything & Everything in its place

Key benefits: No searching for any items, time saving, productivity improvement, cost reduction and Delivery time improvement - PCD

SEISO - Cleaning with Meaning and Doing with Purpose, Cleaning is Inspection

Key benefits: early abnormality detection, machine uptime improvement and cleaning time reduction - PCD

SEIKETSU - Standardizing - Creation of standards, preparing SOP's and Visual Management

Key benefits: reduction of variation in the process and elimination of unsafe conditions and unsafe actions

SHITSUKE - Self Discipline & Training

Key Benefits: adequate knowledge and skill development of employees - directly connected to Morale of the employees

Finally, 5S should be used as Value adding tool and not as a Cosmetic Tool



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Quality Month Knowledge Titbits

01 Nov 2022

Feather 1

Basic requirements for a Kaizen to be successful

Shri C V Gowri Sankar, National Secretary, NIQR

- Keep the scope small; it should never be large.
 - If the scope is small, implementing will be practical
 - Larger scope will delay implementation
- Do not strive for perfection
 - Initially try for solution/improvement to a part of a situation/problem
 - You can always go for another kaizen from this new state
- Results to be presented/published at the completion of kaizen
 - This will motivate members of the team; as well as, another department having a similar situation can benefit from the publication
- A charter is a must at the beginning itself; the charter should have the problem statement, background information, time frame, etc. besides, measurement of the improvement
- Kaizen to be linked with business plan; meeting your organization's goals; remember/remind often resources to perform kaizens are limited
- Picking the right team in the planning stage of the kaizen considering the skill sets, knowledge and expertise
- Do not hesitate to get ideas, from outside the team whose knowledge and expertise will help in the speed of arriving at the solution.
- Last but most important - Management commitment must for all kaizens to succeed in implementation.

