Continually improve Suppliers relationships System Approach Leadership Customer focus Involvement of people Going Digital

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About us

Strong foundation and skilled manpower, TCI offers seamless multimodal transportation solutions. An ISO 9001:2008 certified company, TCIL is listed with premier stock exchanges like NSE and BSE.

The company progressed from being a “One Man, One Truck, One Office” set up to becoming India’s leading Logistics & Supply Chain Solutions provider with a Global presence. After 50 years, TCI moves 2.5% of India’s GDP by value and is the proclaimed market leader of the Indian Logistics Industry.

TCI Group has an extensive network of over 1000+ company owned offices, a huge fleet of customized vehicles and managed warehouse space of 10 million sq. ft. and a strong work force of 5000+. With its customer-centric approach, world class resources, State-of-Art technology and professional management, the group follows strong corporate governance principles and is committed to value creation for its stakeholders and its social responsibilities.

With a Mission to be “the most admired service provider of integrated supply chain solutions”, TCI Supply Chain Solutions brings a lot of commitment in its partnerships with its clients. Dedicated verticals for Auto, Retail, Telecom, Electricals, Pharmaceuticals, FMCG and Cold Chain offer specialized services to these critical sectors of the economy.

TCI XPS an express distribution specialist offers a single window door to door time definite solution for customers' express requirements. Equipped with an ISO 9001:2008 certified operations, TCI XPS delivers consignments of all sizes and weights to 13000 locations in India and 200 countries abroad.

TCI Freight, the largest division of Group TCI, is India’s foremost and Asia’s leading surface transport entity. It has a strong backing in terms of its extensive and strategically located branch network and trained work force.

TCI Global provides a single window advantage to its customers across all major South East Asian countries through a dedicated network of international offices in the region besides having strategic presence in high growth and emerging markets in Asia, Brazil (Latin America) and Africa. TCI Global offers its customers end to end services ranging from customs clearance, international inbound and outbound freight handling (air and sea), primary and secondary warehousing/redistribution, third party logistics, multimodal (air, surface and sea) services, ODC movements, mining logistics and project cargo.

TCI Seaways has well equipped ships in its fleet and caters to the coastal cargo requirements for transporting container and bulk cargo from Ports on the East coast of India to Port Blair in the Andaman and Nicobar Islands and further distribution within the islands.

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Special thanks to the content team of TCI who worked relentlessly behind the scene to make it happen viz. Kriti Sharma, Krishna Rao
Foreword

Dear Readers,

Quality as a definition somehow was always one of the most difficult questions to answer in any forum. We are sure that we will not get any singular definition for this ubiquitous word. It is indeed complex, hence the attempt in this edition of Logistics Focus to share the various Quality Management Systems (QMS) which the logistics and supply chain industry can adopt.

Can QMS be a competitive advantage for logistics and SCM industry aka in manufacturing, the world famous Toyota Production System needs no mention without any doubt a winning edge. Coming home, the E-commerce industry has in a way re-defined “quality in delivery”; hitherto, deliveries in days was quite acceptable and people used to boast about these KPIs, it was that too in a b2b scenario. Now we have delivery lead times of 3-24 hrs to consumers directly!! No one would have believed this few years back. Add to it; in some E-com companies the owners themselves also do one odd delivery, why, to gauge the customer response, the entire delivery mechanism, feedback in short. A very essential aspect, a fulcrum to build quality processes.

So we request all readers to go through the various concepts with case studies presented in this edition carefully, a feedback for your logistics and supply chain organization may be embedded for you to discover.

Have a Quality reading time!!!

Yours truly,

P C Sharma

Mr. P. C Sharma is President and CEO, TCI XPS. He is heading TCI XPS a division of Transport Corporation of India Limited.

PC Sharma has competed AMP from Harvard Business School and GMP from National University of Singapore. He has completed B COM from Rajasthan University. He has attended MDP at IIM Ahmedabad and XLRI Jamshedpur, ISB Hyderabad and others.

He is the driving force behind sustained growth and success of TCI XPS. His vision is to establish TCI XPS division as one of the most admired reputed names in the Indian express logistics industry.
QMS
An Overview

1. TQM in Supply Chain
   By Mr. P.C. Sharma, President & CEO, TCI XPS

2. Six Sigma performance improvement model
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3. Integrating quality into the value chain
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   Siemens Ltd
Since 1980’s, the competition between enterprises has become the one between supply chains. The application of the eight modern TQM principles of ISO9001 in supply chain quality management, namely customer focus, leadership, involvement of people, process management, system management, continual improvement, factual approach to decision-making, and mutually beneficial supplier relationships, so as to promote the improvement of operation efficiency and competition advantage of the whole supply chain system.

Supply chain quality management based on the TQM principles

1. **Customer focus**

Customer focus is the core principle and idea of TQM because quality effort comes of customer’s needs and ends with customer’s acceptance. In supply chain circumstance, customer includes not only the end user but also many in-between users, such as suppliers, manufacturers, sellers, etc. However, more than half of the quality problems in supply chain are resulted by specifications because of the inadequate communications between the members of supply chain. In many
cases, the procurement specifications released by buyers are equivocal while suppliers dare not to argue against buyers on the specifications in the bidding process. Therefore, the core enterprise must pay attention to the needs and expectation of end users, and all the members of supply chain must pay attention to the needs and expectation of their backward users. The needs and expectation of end users should be deployed layer upon layer in the whole supply chain system. The end users will satisfy if all the member of supply chain can satisfy the needs of their backward users. Moreover, the operation efficiency of supply chain system can be improved through the satisfaction level of the end users. In supply chain quality management, some traditional tools of TQM are also effective. For example, we can use Quality Function Deployment (QFD) to identify the distinct and potential needs and preferences of users, use Fishbone Chart to investigate the factors affecting the satisfaction level of users and then use Pareto Chart to find out the key factors.

2. Leadership

The effectiveness of quality management depend on the effectiveness of leadership because quality effort can get actual effect only with the recognition and support of the leaders. In supply chain circumstance, the core enterprise play as the leader since it establishes the development strategy and operation targets of supply chain affect the actual efficiency and effectiveness of the quality effort of all the other members. Therefore, the core enterprise must act as leader to consider adequately the needs and expectation of the other members, establish a clear, realizable and coincident holistic target, and then lead and inspire the other members to strive jointly for the target. At the same time, the core enterprise should foster more leaders of TQM in each layer of supply chain and make them take their responsibility zealously.

3. Involvement of people

The exertion of enthusiasm and creativity of all the employees is the precondition of the actual effect of quality management. In supply chain circumstance, an up-and-coming excelsior work atmosphere should be established to inspire the enthusiasm and creativity of the employees of all the members. Each employee should understand his/her role and responsibility in the supply chain system, solve the problems forwardly as mastership, and learn the principles, skills and technologies of TQM and ISO9001. Here, we can foster the ethos of self-motion and self-knowledge in supply chain through 5S, i.e. seiri, seiton, seiso, seiketsu, and shitsuke. Furthermore, we can make all the employees participate into supply chain quality management and strive for the satisfaction of users jointly through the establishment of QC teams that cross function or even enterprise. 4 Process management
4. Process management

The focus of modern quality view is the process quality management but not the product itself of traditional quality view. It is the requirement of the quality management system of ISO9004:2000 and the essential difference of modern and traditional quality view. In each step of supply chain, there are many correlative processes, such as procurement, logistics, production, inventory, selling, service, etc. These processes have their own independent objectives and programs. There are usually conflicts among the objectives and programs. Therefore, the processes and their mutual effects should be identified and managed to ensure the harmonious operation of supply chain. Then, all the processes, especially the key processes, can realize high quality, i.e. small variation, small waste, and more increment, through the continuous improvement and total quality control in all the nodes of supply chain system.

5. System management

The application of system approach in quality management is to view the quality management system as a big and holistic system, identify and manage the sub-systems respectively. Then, the coordinated effect and mutual promotion among the sub-systems will make the whole effect greater than the sum of the improvement of each sub-system and improve the validity and efficiency of the realization of final targets. In supply chain circumstance, enterprise should confirm the mutual dependence relationship among the processes in supply chain system, break the boundary among supply chain members, construct and integrate the processes in supply chain system. Then, many well operation sub-systems can be constructed to collocate the resources rationally among the sub-systems. Finally, the whole supply chain system, including supply, transport, production, distribution, inventory, etc., can realize the target and policy of quality through the optimal operation mode.

6. Continual improvement

Continual improvement is one of the focuses of modern quality research and practice. Enterprise must improve the quality of product and service continually and reduce the cost to make customer satisfactory. In supply chain circumstance, the pressure of continual improvement is more and more pressing because the market competition is more and more hard. Not only the core enterprise but also the other members, such as suppliers, sellers, and logistics providers, must improve their product and service respectively so as to construct the continual improvement of products and services all over the supply chain process. Then, the continual, stable and harmonious ability of quality assurance can be established. Furthermore, the core enterprise and other members must find the ways and practices improving performance in or out of supply chain through benchmarking to make the continual improvement speed fast than the one of rivals. However, it is ironical that one of the most important reason
in the predicament of Xerox, which initiated benchmarking practices, was exactly its slow reaction with the fast changing environment.

7. **Factual approach to decision making**

The sufficient and adequate data and information is the foundation of making right and effective decisions. Up to now, many enterprises have began to collect and deal with all kinds of data and information by utilizing many advanced information technology, e.g., EDI, MRP, ERP, POS, Intranet/Extranet/Internet, so as to provide foundation for making effective decision. In supply chain circumstance, enterprise should collect data and information of not only itself but also the other members of supply chain to record and analyze the current operation situation of each member. Therefore, the potential problems in any step of supply chain can be found duly according to the results of data analysis.

Then, the corresponding correct and timely decision can be made to avoid or rectify the problem.

8. **Mutually beneficial supplier relationships**

What impact can suppliers have in achieving quality? TQM authorities recommend that organizations work directly with raw material suppliers to ensure that their materials are of the highest quality possible. Currently, at least 50 percent of TQM organizations collaborate with their suppliers in some way to increase the quality of component parts. Often these organizations send out “quality action teams” to consult with their major suppliers. The objective is to help suppliers use TQM to analyze and improve their work processes. Suppliers can contribute to quality in a number of other ways.

Therefore, the organization and its supplier are mutually dependent. Maintaining the mutually beneficial relationships between them can improve the ability of creating value for both of them. In supply chain circumstance, the product quality is performed and ensured by all the members of supply chain because the production, sales and service process must be performed by all the members. Therefore, the task of supply chain quality management is not only to establish the product inspection system and comprehensive evaluation system of suppliers, but also to strengthen the mutual beneficial partner relationships with suppliers. The core enterprise must realize the following activities:

- Identify and select the main suppliers, reduce the scale of supply system, and realize small supply base management;
- Investigate the requirements of customers and develop new product jointly with suppliers;
- Share information, technology, and resource with suppliers;
- Admit the improvement and achievement of suppliers;
• Take joint improving activities with suppliers;
• Ensure the conformity of quality system between core enterprise and the other members, including basic conformity (e.g. program files, technology specification, process interface) and advanced conformity (e.g. quality target, quality policy, and quality culture).

In fact, there is a new trend in the international practices of supply chain management. Namely, more and more large-scale enterprises have pay attention to the management and development of suppliers, e.g. providing capital, technology, human resource, equipment and training for suppliers, sending quality teams to help suppliers improve their processes, and sharing the yields of continual improvement with suppliers.

Conclusion:
The series standards of ISO9001 are made for the standardization of quality management and quality assurance. Therefore, in supply chain circumstance, the implementation of ISO9001 is the basic assurance for an enterprise to provide acceptable product or service and improve the quality level in a certain supply chain. The application of the eight modern TQM principles of ISO9001 in supply chain quality management will promote the improvement of operation efficiency and competition ability of the whole supply chain system.
Six Sigma performance improvement model
By Mr. Pradeep Sharma, Master Black Belt-Anexas

Pradeep Sharma is a LeanSix Sigma Master Black Belt, PMP and CPHQ certified with 14+ years of process excellence. He is trained in Six Sigma at Anexas and has implemented Six Sigma and Lean in various leading organization. Presently Pradeep is with Anexas as Six Sigma Master Black Belt, consulting leading organizations in Middle East & India.

Six Sigma® is a performance improvement model developed by Motorola to improve its business practices and increase its profits. The Six Sigma® model has been adapted to many types of businesses, including transportation, logistic and supply & chain industry. Six Sigma® is a data-driven performance model that aims to eliminate “defects” in processes that involve products or services. The goal is to achieve Six Sigma, meaning no more than 3.4 defects in every 1 million opportunities.

The focus is on continuous improvement, with the customer’s perception as key, so that the Customer defines that which is “critical to quality” (CTQ). Two different types of improvement projects may be employed: DMAIC (define, measure, analyze, improve, control) for existing processes or products that need improvement and DMADV (define, measure, analyze, design, verify) for development of new, high-quality processes or products.

Both DMAIC and DMADV utilize trained personnel to execute the plans. Six Sigma® personnel have martial arts titles: Green belts and black belts execute programs, and master black belts supervise programs.

Use of six sigma: The first project type for Six Sigma® is DMAIC (define, measure, analyze, improve, control), which is used when existing processes or products need quality improvement:

• **Define**: Define costs and benefits that will be achieved when the changes are instituted. Develop a list of customer needs, based on complaints and requests.
• **Measure** input, process, and output. Collect baseline data. Perform a cost analysis. Calculate the sigma rating.
• **Analyze** root or other causes of current defects. Use data to confirm your analysis. Uncover steps in processes that are counterproductive.
• **Improve** by creating potential solutions. Develop and pilot plans. Measure the results. Determine the cost savings and other benefits to customers.
• **Control** the work processes by standardizing them. Monitor the system by linking performance measures to a balanced scorecard. Create processes for updating procedures, disseminating reports, and recommending future processes.
Lean-Six Sigma performance improvement model:

Lean-Six Sigma is a performance improvement model that combines Six-Sigma with concepts of “lean” thinking by focusing process improvement on strategic goals, rather than on a project-by-project basis. A Lean-Six program is driven by strong senior leadership, who outline long-term goals and strategies to employees. Workers are an important part of the Lean-Six process, and must be included and engaged. The basis of Lean-Six is to reduce errors and waste within the organization through continuous learning and rapid change. Lean-Six has four characteristics:

1. Long-term goals with strategies in place for 1—3 year periods.
2. Performance improvement is the underlying belief system.
3. Cost reduction through quality increase, supported by statistics evaluating the cost of inefficiency.
4. Incorporation of improvement methodology, such as DMAIC, PDCA, or other methods.

How it can help the organizations:

1. This methodology can help us in improving our processes
2. It can help in reducing the waste from the processes
3. It can help in reducing the variation in the output
4. It can reduce the cost
5. It can improve efficiency and productivity
Increasing public awareness, rapid global media coverage of incidents and higher customer expectations are forcing manufacturers to take a fresh look at their Quality Management approaches.

How are companies responding? Over the last decade, driven by globalization, expanding consumer rights and higher customer expectations, product and service quality has become increasingly important.

Bad news on quality defects spreads more rapidly all over the world than ever before, and the immediate reputational and financial effects can be devastating. At the same time products need to be much more than just “defect-free”. Customers now perceive high reliability and full alignment of product characteristics with their expectations as a basic threshold requirement rather than a differentiator.

All this is driving companies to take a fresh look at their Quality Management function. Is it enough for Quality Management to focus on providing assurance and control that products and services meet their specified requirements, or can it provide more value to the business?

The changing role of Quality Management

In some leading companies there has already been an evolution in the role of Quality Management from a traditional business support function towards a role that is actively involved in shaping products and customer services that appeal to customers. Three typical stages can be identified.

Stage I – Assurance

Virtually all companies have passed through Stage I, where the focus is on achieving zero defects and reducing warranty and/or complaint costs through enhanced processes with clear responsibilities and KPIs.

This is the traditional role of the Quality Management function, but it has a number of drawbacks. For example, Quality staff may only be involved at the end of the process, so they have little or no opportunity to influence product and service design. They are often seen as “policemen” who are noticed only when they say no, further emphasizing the distance between Quality staff and the core business.

Stage II – Empowerment

Most organisations have by now also reached Stage II, where the Quality Management role has evolved towards empowering the whole organisation (not just the Quality function) to take on ownership and responsibility for quality in a more holistic way. This approach recognizes more clearly the value-adding...
potential of the Quality Management function and its role in support of the business.

The proactive use of Quality in customer management is also a feature of this role.

To drive accountability, empowerment and continuous improvement, the Quality function model often moves away from being a centralized and sometimes siloed organization towards greater decentralization. For example, in a recent study it was found that more than 70% of consumer goods companies have already implemented, or are moving towards, devolution of the Quality function into the business units.

**Stage III – Customer Delight**

In Stage III, Quality Management also acts as a central facilitator between Marketing & Sales, Manufacturing and R&D to ensure that product and service quality not only meets but exceeds customer expectations. In this role, and building on their understanding of customer feedback, Quality Management departments provide processes and tools that help support the transformation of customer demand into attractive products and services.

One of the key features of Stage III is that Quality Management becomes a key partner in the value chain, as opposed to being the source of hurdles to be overcome. As “designing in quality” from the beginning becomes more important, the role of Quality Management shifts more towards being a solution provider. This has profound implications for the required skill sets and behaviors of Quality Management staff.

There are some good illustrations of this evolution in the automotive sector. For example:

- Volkswagen’s Quality Management function initiated the People’s Car Project in the company’s main market, China. Using a web-based platform, Chinese customers can express their ideas for product features and become actively involved in the creation of new cars.

- During the past 10 years, BMW has made huge progress in reducing the number of warranty cases by more than 50%, through integration of Quality within the entire value chain. Each Quality program, from Purchasing through to Production, Sales and After Sales, contributed to this success.

Automotive industry OEMs use Quality KPIs that measure not only defects, complaints and other negative performance attributes, but also customer appeal. This contributes significantly to overall product attractiveness.

There is good evidence that this results in a higher share of customers who are willing to buy or lease a car from the same brand again or to give recommendations to a friend, relative or colleague.

Quality Management also has a key role to play in the capture and interpretation of customer intelligence, including not only complaints but also the richer and more complex data that is now available through a variety of digital channels.

Quality Management can be effective in helping to ensure consistent treatment of this intelligence across different functions, rapid identification of regional and other trends, and enabling a consistent face to be directed towards the customer, with positive customer experience at every touch point.
For example, one leading global food company is currently looking at adapting the role of the Quality function to act as a facilitator to help align marketing, product development and supply chain activities to meet the needs of key food service client accounts.

**Bringing about the change**

Evolving Quality Management to the level of a value-adding business partner requires broad-based change in strategy, processes, organization and culture. The ultimate starting point is an inspiring Quality ambition for the company.

**What are we aiming for? How can Quality Management support the business and be seen as a partner? What are the competencies we can exploit? What are realistic targets and quick wins on our way?**

**We see three essential priorities in making the change:**

1. **Redefine and recommunicate the role of Quality Management**, emphasizing the extension of the role beyond assurance and safeguarding towards problem-solving, facilitating and enabling.
   
   Ensure that this is underpinned by aligned senior leadership behaviors, appropriate elevation of Quality as a business priority, suitable behavior of Quality staff and clear business-related Quality KPIs.

2. **Find the right people who are competent and committed to assume the new responsibilities.** This will require a shift in focus from the more traditional scientific and compliance skillsets to a more influencing, facilitating and business-orientated set of capabilities.

3. **Embed the mindset in the entire organization to deliver Quality beyond expectations.** Focus on driving clear accountability for Quality Management into the business units.

**Insights for the executive**

In the past many corporate functions, such as Information Management and Human Resources, were seen as merely unavoidable overheads, part of the cost of doing business.

However, over the years they have evolved into key strategic assets, with important contributions to make to business success. What we are seeing today in Quality Management is in many ways no different. The next generation of Quality Management is holistic, strategic and value-adding.

**Conclusion**

Quality is no longer the policeman; it has now become the business partner. Can we survive without reaching the highest benchmarking & challenging the same too in today’s VUCA world!!! Think on it!!! The Smart phones evolution case is in front of all of us.
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QMS: Complexities: Tools & Processes

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Supply Chain and Logistics sector has today grown to over USD 100 billion and contributes immensely in the growth and development of the Indian economy. Today, when the country’s economy is facing challenges, the supply chain and logistics sector can play a pivotal role in the rapid bouncing back of our economy. India spends 13 percent of its Gross Domestic Product (GDP) on supply chain and logistics while other developing countries spend around 10 percent.

While India is ahead of China on domestic logistics efficiency, it trails behind China on important indices such as customs procedures, overall infrastructure quality, international shipment, logistics competence and tracking of shipments, significantly due to their strong logistics infrastructure. Cost saving measures could help boost India’s logistics efficiency across the supply chain.

Modal shift leading to increased transportation by rail, rather than by road, is expected to help domestic logistics players offer more cost-effective services to their clients and this in turn is likely to accelerate flow of goods and expand the logistics market for service providers, which again leads to lower costs.

The effective implementation of TQM in Supply Chain can reduce costs and maximize the profits by rendering quality services. The concept of TQM, its components and the principles of Lean supply chain management have become important for business leaders today and are outlined here.

TQM is a management approach that originated in Japanese industry in the 1950’s and has become steadily more popular in the West since the early 1980’s. Total Quality is a description of the culture, attitude and organization of a company that aims to provide, and continue to provide, its customers with products and services that satisfy their needs. TQM refers to continuous profitability improvement. TQM is an overall organizational strategy with accompanying techniques that deliver quality products and / or services to customers.
Increased competition is leading businesses to experiment with various strategies like Business Process Re-engineering (BPR), managing core competencies, Benchmarking practices and Total Quality Management (TQM) with a sudden sense of urgency. Important aspects of TQM include customer-driven quality, top management leadership and commitment, continuous improvement, fast response, actions based on facts, employee participation, and a TQM culture. This involves the continuous improvement of organization processes, resulting in high quality products and services.

Optimizing the product flows requires adopting a process approach to the business. There has also been an overwhelming need of a better Logistics and Supply Chain Network within the country so that the existing supply chain cost could be reduced.

**TQM in logistics and supply chain management**

The implementation of TQM in most Industry sectors can contribute to the development of systems, integrating activities into key Supply Chain Processes. Sharing information between Supply Chain partners can only be fully leveraged through process integration. Supply Chain business process integration involves collaborative work between Buyers and Suppliers, joint product development, common systems and shared information. Key Supply Chain processes would include:

- Customer Service Management; Procurement;
- Product development and commercialization;
- Manufacturing flow management/support;
- Physical distribution;
- Outsourcing/Partnerships;
- Performance measurement.

Customer Relationship Management concerns the relationship between the organization and its customers. Customer service provides the source of customer information. It also provides the customer with real-time information on product availability through interfaces with the company's production and distribution operations. Many successful organizations use following steps to build customer relationships:

- Determine mutually satisfying goals between organization and customers
- Establish and maintain customer rapport
- Create a positive approach in the organization towards the customers

Strategic plans are developed with suppliers to support the manufacturing flow management process and development of new products. In firms where operations extend globally, sourcing should be managed on a global basis. The desired outcome is a win-win relationship, where both parties benefit, and compress the design cycle and product development time. Also, the purchasing function
develops better communication systems, leveraging electronic data interchange (EDI) and Internet linkages to transfer possible requirements more rapidly. Activities related to obtaining products and materials from outside suppliers requires performing resource planning, supply sourcing, negotiation, order placement, inbound transportation, storage, handling and quality assurance, many of which include the responsibility to coordinate with suppliers in scheduling, supply continuity, hedging, and research into new sources or programmes. Here, Customers and Suppliers must be integrated into the product development process, thus to reduce time to market. As product life cycles shorten, the appropriate products must be developed and successfully launched in ever shorter time-schedules to remain competitive.

**Lean supply chain management**

This is an effective tool for reducing wastage and improving efficiency, productivity and ultimate profitability. Lean Supply Chain Management is one of the most important areas of supply chain management. Attaining a lean supply chain means addressing or resolving issues which impact time, inventory and costs. The Company adopting lean supply chain practices streamlines various supply chain activities to reduce and eliminate waste or non-value added activities along the supply chain flow. Lean supply chain management is not exclusively for those companies who manufacture products, but by businesses who want to streamline their processes by eliminating waste and non-value added activities. Lean supply chain management requires businesses to examine every process in their supply chain and identify areas that are using unnecessary resources, which can be measured in monetary value, time or raw materials.

Implementation of lean improves the company’s overall competitiveness as well as its profitability. Lean management practices helps to achieve lower inventory carrying costs, reduce waste and improve responsiveness to demand fluctuations and closer integration with supply chain partners. It also helps to improve company’s overall profitability. Though these benefits are significant in a slow and stagnant economy, it will continue to yield additional benefits when economy returns to growth mode.

When demand accelerates, lean organizations have more flexibility to meet customer requirements in a timely and profitable manner. Therefore, companies should start to implement lean strategies in their supply chain in the current slow-paced economy, so that once the economy and demand revives, these organizations will be in a profitable position to scale up to meet the higher demand.

**Principles of lean**

The five principles of lean are:

1. Define value
2. Identify the value stream
3. Make the value flow
4. Create a Pull
5. Pursue perfection

**Specify value**: Value is defined by the customer. The end customer of the process. If you are on a lean journey and involve suppliers, your tier 1 suppliers are customers of tier 2 Suppliers, etc. Looking closely at what creates value for each customer in the process (as well as the products consist of many purchased components (or whose understanding the entire value stream and the customers need a...
operations of such an organization is good; however stopping at that point would be a mistake.

**Identify the value stream:** The value stream includes all of the information and material flow steps necessary to bring a product to the end customer. The obviously involves supplier. In many cases, both the information and material flows going in and out of each player in the value stream are full of wastes that would go unseen without mapping the value stream.

**Make the value Flow:** Flow means moving material or information from one value-added step to the next with as little delay as possible. In many cases, it is associated with internal manufacturing only. However, it is applicable to both information and material flows within an extended value stream. Having information flow through the value stream without delays or errors can result in dramatic improvements in customer service and reductions in lead times and inventory. Better material flow within supplier plant and between plants can result in improvements as well.

**Create a Pull:** This has a very obvious implication form suppliers. Most organizations do not pull form suppliers, and many of those that do have “pull” systems in place are pulling from a supplier that is operating in “mass production” mode. This means that additional costs, in the form of inventory, defects and other wastes are inside the supplier’s four walls. Any customers who assume that those costs are not being passed on to them are in naïve. Thus, it is important to setup true pull systems with supplier, who has bought in to the philosophies of lean.

**Pursue perfection:** For the extended value stream, seeking perfection simple means continuing to remove wastes in the entire value stream by working closely with suppliers on programs such as product design for manufacturability, supplier associations, and other programs that aim at learning the value streams out.
Some of the indicative benefits of lean seen by organisations

- Reduces total cost of ownership by up to 15%
- Reduces inventory levels by 25%
- Reduces logistics costs by 15%
- Reduces space requirement by 40%
- Reduces lead time by 30%
- Increases fill rates by 15%
- Improves supplier performance and accountability
- Improves customer satisfaction and customer relationships
- Improves competitiveness

**Conclusion:**

To conclude, process improvements including implementation of lean principles in the supply chain are critical to the competitiveness of organisations. When pursued in parallel to improvement in hard and soft infrastructure, TQM can significantly improve competitiveness and contribute to the improvement in the Indian economy.
Kaizen and 5S for Process Improvement & to Create a Lean Environment

By Mr. Angshuman Seal, South Asia Delivery Head, Linde India Limited

He is heading Logistics department at Linde & managing critical logistics functions under stringent –HSE Standard.

Let’s start with defining daily Continuous Improvement or KAIZEN:
Keep our theme in mind: There is always a better way to do anything. When you come in every morning and do your routine work, look for ways to improve anything you do. Look at your work differently. Take the blinders off and try something new that might help productivity, efficiency, improved product flow or throughput. Ask, “Why are you doing this?” Is it because you always have, then rethink what you are doing. Are you measuring what you can, but not what matters? Are you persisting on what doesn’t work? It is critical to understand the importance of flexibility in a process, because customers demand it.

How does the Kaizen system work?

KAIZEN and continuous improvement or somewhat interchangeable.
The word Kaizen means “continuous improvement.” It comes from the Japanese words 改 ("kai") which means “change” or “to correct” and 善 ("zen") which means “good.” It is pronounced “k-eye-zen.” Kaizen means small steps of continuous improvement. Continuous improvement should be monitored and implemented daily. It is the continuous search for imperfections by all employees. They both take daily discipline. All employees must embrace it. So there is a learning curve, but once adopted there is no turning back. It can mean as much as a 10% increase in productivity and quality. Management will look to employees for daily ideas on how to improve their jobs to increase throughput and velocity to the customer. Teamwork and achievement are created by implementing Kaizen. The use of cross-functional teams to look at areas, audit them for 5S or KAIZEN is critical. Cross-functional teams look at things differently due to their diverse backgrounds and come up with some great ideas...
Kaizen suggestions are not limited to a specific area such as production or marketing. Kaizen is based on making changes anywhere that improvements can be made. Western philosophy may be summarized as, “if it ain’t broke, don’t fix it.” The Kaizen philosophy is to “do it better, make it better, improve it, even if it isn’t broken, because if we don’t, we can’t compete with those who do.” Kaizen encompasses many of the well-known Japanese process improvement methods such as: quality circles, process automation, suggestion systems, just-in-time delivery, Kanban and 5S.

The cycle of kaizen activity can be defined as:

- Standardize an operation and activities.
- Measure the standardized operation (find cycle time and amount of in-process inventory).
- Gauge measurements against requirements.
- Innovate to meet requirements and increase productivity.
- Standardize the new, improved operations.
- Continue the cycle continuously. Key elements of kaizen are quality, effort, involvement of all employees, willingness to change, and communication.

What tools can be used for Kaizen to Create a Lean Environment?

- **Value Stream Mapping (VSM):** Similar to a flow chart, this tool maps the current and future state of the process separating value-added from non-value-added activities.
- **Root cause analysis:** This set of problem solving tools aims to identify the root causes of problems or events. Take Inventory Records Accuracy: if the on hand balance in the warehouse does not match the on-hand balance on the computer or ERP system, you have to find out why: Is it a location error? Counting error? Bill of material error? Wrong part number? …before you change these two (2) numbers to match, find the root cause and resolve it by reviewing the transaction detail in the Warehouse Management System (WMS). Once resolved write a Standard Operating Procedure (S.O.P) to eliminate it.

The Five Whys: 5- Whys Examples

**Problem Statement:** Customers are unhappy because they are being shipped products that don’t meet their specifications (this is a violation of the LEAN philosophy).

1. **Why** are customers being shipped bad products?
   - Because manufacturing built the products to a specification that is different from what the customer and the sales person agreed to.

2. **Why** did manufacturing build the products to a different specification than that of sales?
• Because the sales person expedites work on the shop floor by calling the head of manufacturing directly to begin work. An error happened when the specifications were being communicated or written down.

3. **Why** does the sales person call the head of manufacturing directly to start work instead of following the procedure established in the company?

• Because the “start work” form requires the sales director’s approval before work can begin and slows the manufacturing process (or stops it when the director is out of the office).

4. **Why** does the form contain an approval for the sales director?

• Because the sales director needs to be continually updated on sales for discussions with the CEO.

In this case only four Whys were required to find out that a non-value added signature authority is helping to cause a process break down.

**What is 5-S??**

5S is a productivity method whose name is derived from the five first letters of Japanese words: Seiri, Seiton, Seiso, Seiketsu and Shitsuke. The method was originally intended to organize a workspace for efficiency. Let’s examine each ‘S’ and determine what it means.

• **Seiri** – Sorting. Keep the necessary in work area, dispose or keep in a distant storage area less frequently used items, discard unneeded items.

• **Seiton** – Systematic Arrangement for the most efficient and effective retrieval. There should be a place for everything and everything should be in its place. The place for each item should be clearly labeled or demarcated. Items should be arranged in a manner that promotes efficient workflow, with equipment used most often being the most easily accessible. Workers should not have to bend repetitively to access materials.

• **Seiso** – Shining. Clean the workspace and all equipment, and keep it clean, tidy and organized. After the first thorough cleaning when implementing 5S, daily follow-up cleaning is necessary in order to sustain this improvement. A “Shining” work environment will lead to great efficiency gains.

• **Seiketsu** – Standardizing. Work practices should be consistent and standardized. Work stations for a particular job should be identical. All employees doing the same job should be able to work in any station with the same tools that are in the same location in every station. Everyone should know exactly their responsibilities.
• **Shitsuke** – Sustaining. Once the previous 4 S’s have been established, they become the new way to operate. Maintain focus on this new way and do not allow a gradual decline back to the old ways. The effect of continuous improvement (Kaizen) leads to less waste, better quality and faster lead times.

5S was originally intended for manufacturing but works just as well in an office environment or administrative environment or even in a healthcare environment for delivering patient care. A book I recommend for Healthcare professionals is 5S for Healthcare by Rona Consulting Group, available on Amazon. According to the book, “the 5S system sounds so simple that people often dismiss its importance. However, the fact remains that a neat and clean healthcare facility:

• Has higher productivity.
• Produces fewer clinical defects.
• Means patients do not wait so long for treatment.
• Is a safer place to work.” If you are in the healthcare industry, you will realize that these are big benefits that we constantly strive for.

**Conclusion:**

To conclude, entire India needs to follow 5S that is what the government has initiated with SWACH Bharat abhiyan. We need not say anything much in conclusion, remains a dream.
OSHA’s Top 10 Warehouse Citations

By Mr. Ankush Rajurkar, Logistics Leader - Supply Chain, GE India

He is responsible for logistics sourcing and execution for India Supply Chain Logistics Trade Compliance at GE India. Mr. Ankush has a work experience of 24 years in the industry.

About OSHA

Safety in warehouses is regulated by a series of standards from the Occupational Safety and Health Administration, commonly known as OSHA.

OSHA issues many publications on safety issues in a warehouse and the solutions that can be adopted by businesses to reduce accidents and minimize injury. The list below is their top 10 areas for which they issue citations.

1. Forklifts
2. Hazard communication
3. Electrical, wiring methods
4. Electrical, system design
5. Guarding floor & wall openings and holes
6. Exits
7. Mechanical power transmission
8. Respiratory protection
9. Lockout/tagout
10. Portable fire extinguishers

Forklifts

Forklifts can be dangerous, OSHA records about 100 warehouse employees are killed and 95,000 injured every year in forklift accidents while operating forklifts.

The majority of fatalities are caused by forklift turnovers. Being crushed between a forklift and another surface is the second highest percentage, followed by getting struck a forklift and then getting hit by falling material from a dropped load.

OSHA issue guidelines on forklift operation including the following:

• Train, evaluate and certify all operators to ensure that they can operate forklifts safely, follow safe procedures for picking up, putting down and stacking loads
• Drive safely and never exceeding 5 mph and slow down in congested areas,
• Maintain sufficiently safe clearances for aisles and at loading docks or passages where forklifts are used
Logistics Focus

• Train employees on the hazards associated with the combustion byproducts of forklift operation, such as carbon monoxide.

Hazard Communication

Hazard communication refers to the information about chemical hazards and the associated protective measures that is communicated to employees and employers. Chemicals pose a wide range of health hazards, such as irritation, and physical hazards, such as flammability and corrosion. Chemical manufacturers and importers to evaluate the hazards of the chemicals they produce or import; and providing information about them through labels on shipped containers and more detailed information sheets called material data safety sheets (MSDS).

OSHA recommend a number of measure with regards to hazard communication:

• Employees should be trained on the risks of each chemical being stored.
• Provide spill cleanup kits in any area where chemicals are stored.
• Have a written spill control plan.
• Train employees to clean up spills, protect themselves and properly dispose of used materials.
• Provide proper personal protective equipment and enforce its use.
• Store all chemicals safely and securely.

Electrical Safety

Many times electrical hazards are the cause of injuries and fatalities in the workplace. As well as being dangerous in a warehouse it is one of the leading causes of accidents in construction sites. The first step towards electrical safety is controlling or eliminating factors in your warehouse that pose electrical hazards. Ground fault electrical shock is a common electrical hazard. OSHA requires that employers provide ground fault circuit interrupters (GFCIs) for receptacle outlets. Warehouses should provide assured equipment grounding conductor program. Either of these methods can eliminate hazards in ground fault electric shock.

Guarding Floor And Wall Openings and Holes

The easiest way to avoid falls in the warehouse is by eliminating and controlling fall hazards. This can be achieved by the use of fall protection equipment or devices. There are basically two types of fall protection. With a combination of both, you can ensure a safer environment for employees who are exposed to fall hazards.

One type of fall protection is the fall restraint; these systems consist of equipment that prevent a free fall, for example guardrails/standard railings, full body harness, and warning lines. The other type is the fall arrest, these systems help by stopping a fall in progress or saving an employee in the middle of a fall, for example the use of safety nets.

Respiratory Protection

Many accidents occur each year and most of the time it's because of the absence or lack of personal protective equipment (PPE). OSHA strictly regulates employers to provide their employees with proper PPE. Many accidents occur not because of absence or lack of PPE but because
employees do not to wear it. This is particularly true of respiratory protection. In some warehouses there is the presence of toxic airborne substances. This is where respirators should be used by employees.

Respiratory protection is designed to protect the wearer from dust, fumes, paint spray, pesticides and other substances that could bring about long-term or permanent impairment or even death. As with other types of PPE, safety programs provided to warehouse employees must specify the proper ways to clean, maintain and repair respirators.

**Lockout/Tagout**

In the warehouse there is often defective or damaged equipment. It is important that these items are tagged with an “Out of Service” until it gets replaced or repaired. This will keep employees away from items that may cause serious injury or illness. According to OSHA, tag is “a device usually made of card, pasteboard, plastic or other material used to identify a hazardous condition”. Many companies are cited by OSHA because tags are not used in the correct way.

**Conclusion**

A lot of value-adds are now being done in warehouses and yards, however there is no mandatory requirement for complying with OHSA in India unlike abroad where a minor mishap with a forklift is considered as a disaster and recorded!! A long way for Indian warehouses to reach this level. However MNCs including the new E-commerce warehouses do have strict safety policies laid out, so an example for all others to follow for sure.
Improving Inventory Accuracy

By Mr. Sanjeev Mohan Seth, Head-Logistics & Strategic Sourcing, Jaquar & Company Private Limited.

He is a Mechanical Engineer from DCE, with 23 Years’ Experience in various areas of Supply Chain & Manufacturing. Worked in Leadership positions in various Organizations like Gillette, Xerox, New Holland Tractors & Jubilant Life science.

Inventory accuracy is vitally important; the challenge lies in achieving it. Out-of-stock items cause profit loss, but paying for inventory storage and transportation also impacts the bottom line. There are 10 practical ways to improve inventory accuracy.

1. **Pick a quality program and stick with it.** Companies can choose from a variety of inventory quality programs such as ISO, lean manufacturing, Six Sigma, kaizen, and Total Quality Management. Make sure everyone in the company supports the program and uses it.

2. **Know what you are up against.** What is your current inventory accuracy rate? You can’t improve what you don’t know. Once you establish a benchmark, set an improvement goal—aim either for a specific percentage or dollar figure. Check your results often to make sure you achieve and sustain improvements.

3. **Keep your processes simple.** "If you can’t describe what you’re doing as a process, you don’t know what you’re doing." Keep your measures simple and manage them every day.

4. **Examine your entire supply chain.** Create and measure a “perfect order” metric from point of origin to final destination. This allows you to track inventory performance across your entire network and improve accuracy throughout the supply chain. Duplicate these successes and share improvement strategies so all areas of the organization can benefit. Also, hone your forecasting skills and help business partners, vendors, and customers do so as well.

5. **Establish product traceability during the distribution life cycle.** Include your entire inventory pipeline—inbound and outbound shipments as well as inventory in the DC. Never move product unless the action is authorized and recorded.

6. **Select technology that fits your needs.** A variety of inventory systems exist, from simple paper to advanced RFID technology. You can’t go wrong with a real-time RF solution. It is affordable and accurate when used properly.

7. **Implement a continuous cycle-counting program.** Using cycle counting to maintain high levels of accuracy is one of the best ways to identify problem areas. An effective cycle-counting program eliminates the need for physical inventory expenses.

8. **Make sure your employees are trained and informed.** If workers understand the company’s inventory goals, they will help accomplish them by performing processes accurately and consistently.

9. **Examine your entire supply chain.** Create and measure a “perfect order” metric from point of origin to final destination. This allows you to track inventory performance across your entire network and improve accuracy throughout the supply chain. Duplicate these successes and share improvement strategies so all areas of the organization can benefit. Also, hone your forecasting skills and help business partners, vendors, and customers do so as well.

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9. Choose supply chain partners who offer systems that interface with your inventory system. Many inventory issues stem from data and transmission failures. Working with capable supply chain partners and using compatible systems helps improve end-user delivery accuracy and customer service.

10. Make sure everyone throughout the organization owns inventory accuracy. Every business unit within the company should understand its impact on inventory accuracy. Many companies overlook the simple truth: managing inventory effectively is a key to business success.

**Conclusion:**
A very difficult subject for clients and LSPs/WSPs, WMS has been adopted yet challenging to manage inventory and always remains a key of failure or success in any supply chain, end of the day inventory is cash.
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Logistics Focus QMS: Green Perspective

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QMS: Green Perspective

8. HSE management system
   By Editorial

9. Risk associated due to complexities in Chemical Transportation in India
   By Mr. Jasjit Sethi, President & CEO, TCI Supply Chain Solutions
To ensure compliance, an assessment has been developed where the practical implementation methods are explained in order to secure and improve HSE standards and share best practices across the Group. The assessment tool rates the implementation methods on a scale of Low – Average – Good – Best Practice – World Class. All manufacturing plants perform annual self-assessments according to this tool, and the results are used for prioritizing improvement actions and programs.

**The HSE Principles are:**

1. **Leadership and Commitment**
   Management and staff understand their HSE accountabilities and are responsible for leading and engaging in meeting policies, management principles, standards, procedures and objectives.

2. **Policy and Strategic Objectives**
   HSE policies are established, HSE objectives are set and an HSE management system is implemented to achieve the requirements of the policies.

3. **Roles, Responsibilities and Competence**
   HSE is a line responsibility. Organization, roles and HSE responsibilities are clearly defined and documented. Personnel are competent to conduct their assigned roles and activities.

4. **Risk Management**
   Hazards are identified and associated risks assessed. Risks are managed to a level that is tolerable and as low as reasonably practicable (ALARP principle). Changes in design, operations, procedures, site standards, facilities, equipment or personnel are evaluated and managed to ensure that HSE and process safety risks arising from these changes remain at an acceptable level.
5. **Product Stewardship**
Product Stewardship is ensured in the whole lifecycle from R&D, design, sourcing, manufacturing, distribution, installation, maintenance, decommissioning through disposal and recycling. All products are in compliance with relevant prevailing legislative regulations.

6. **Supply Chain Management**
Contracting of services and the purchase, hire, or lease of equipment and materials are carried out in a manner to ensure that HSE requirements are met.

7. **Design and Construction**
Facilities, utilities and equipment and modifications of these, are designed, procured, constructed, and commissioned to manage HSE risks through their life cycle.

8. **Operations and Maintenance**
All facilities, utilities and equipment are operated, maintained, inspected, and tested using systems and procedures that manage HSE risks.

9. **Incident Management**
Incidents are reported, investigated, mitigated and communicated. Incidents are investigated for root causes and analyzed for trending patterns. Effective corrective and preventive actions are taken and lessons shared to reduce future injuries and losses.

10. **Emergency Management**
Procedures and resources are in place to effectively prepare and respond to emergency situations to protect people, the environment, the REC reputation and property. Threats and risks of emergency are identified in the whole value chain and measures are taken to manage them.

11. **Occupational Health and Safety Management**
Employees are fit to perform their required duties. Appropriate controls are in place to provide protection from the health and safety hazards associated with the whole company's activities.

12. **Environmental and Climate Management**
Commitment to maximize the positive contribution from renewable and climate-friendly solar energy at affordable prices globally. This includes maximizing the energy efficiency of its products, minimizing negative environmental impacts and carbon footprint as well as preventing pollution from all business activities and products.
13. Documentation and Legal requirements
Applicable laws, regulations, permits, codes, standards, practices, and other requirements are identified and complied with, and documentation is managed through formally controlled processes. Records are maintained and readily available.

14. Performance Monitoring, Assessment, Review and Improvement
HSE performance and systems are monitored, audited, and reviewed to identify trends, measure progress, assess compliance, drive continuous improvement, and provide assurance that governing processes are working effectively.

Conclusion:
HSE or SHE, whichever way you write the acronym the fundamentals remain the same. The only paradox is that we consider this as a program or standard to implement whilst it should be the way of life as the western world and the Japanese especially have taught us.
Introduction: One issue that sets chemical logistics apart from many other logistics disciplines is the potential danger posed by the cargo. Transporting chemicals presents unique logistics requirements because of the inherent dangers involved and potential impact on health, safety, security, and the environment (HSSE). Though; India is 3rd largest producer of agro-chemicals globally, the 6th largest producer of chemicals in the world as well as produces 16% of the world's dye's, safe transportation of chemicals remains one of its biggest challenges.

Challenges in India stem from ignorance, lack of education and inadequate training of personnel, poor condition of roads as well as warehouses and related infrastructure. Another fact is the lack of proper safety precautions followed either by the consignor /consignee as well as on part of the transportation safety authorities. In addition pilferage, high levels of fragmentation of the industry and poor storage structure also contribute greatly towards compounding the situation even further.

To rectify the problems of the chemical transportation industry a serious re-appraisal of the basic eight guiding principles of the industry is the need of the hour. These are 1) Training 2) Legal requirements 3) Planned risk management 4) Ongoing improvements 5) Community interactions 6) Policy documentation 7) Provision of information and 8) Emergency response capacity building.

Safety is serious business for the chemicals industry. Because of the nature of its products, the industry needs to be more vigilant than most to ensure that goods are not spill or are tampered with during transit. Over the past decade, various legislations, actions, and initiatives have helped to improve the industry's safety and security practices.

Continuous efforts to improve safety during the transport and the associated handling of chemicals have become a part of the aim to improve safety performance of both the chemical and transport industry.

The estimated size of the chemical market is USD 144 Billion in India. It is broadly divided into 7 categories:

The chemical industry has witnessed significant changes post-liberalization. Changing demand profiles & trade patterns, increasing logistics costs, rising competitive intensity and the focus on Quality, Safety, Health and the Environment have...
resulted in pressure on product margins and overall profitability. The need of the hour for chemical companies is to figure out how to best serve their most profitable customers at the lowest cost.

Chemical logistics requires a mix of means such as trucks, trains, ships, barges, tankers, and the like. Bulk movement of chemicals occurs in huge volumes, involving very large crude carriers (VLCCs) and a variety of multiparcel chemical tankers. A new concept for movement of liquid bulk chemical is taking shape in India - ISO Tanktainers. The concept is well used in foreign countries but yet to get full acceptance in India. An ISO tanktainer container is simply a cylindrical tank set inside a frame of the standard dry container so that the machinery used for the dry containers can also handle the entire apparatus. This allows the tank containers to be stacked one atop another on ships, loaded on trucks, rail, and the like. A tank container offers several advantages over the conventional modes of shipping chemicals such as drums:

1. It is environment-friendly because it minimizes the spillage during filling/unloading and leakage during transport. It permits the transport of dangerous chemicals in a safe manner.

2. It is more cost-effective because it permits a higher payload compared to use of drums stowed in conventional dry containers (43% more volume). Its modular construction, ease of portability, and mechanized modes of handling all contribute to the cost savings.

3. It allows multimodal transport.

4. It is reliable, secure, and designed to last for 20 –30 years.

5. It is cleanable, reusable, and can be placed into alternate commodity service with minimum downtime.

6. Customers who have limited space or wish to avoid the high cost of permanent storage can use it for temporary storage.

The risk of danger is what makes chemical logistics different from most other branches of supply chain management. Anyone who transports or stores a chemical must thoroughly understand how to handle that product.
Challenges in the chemical logistics industry:

• **Safe transportation of hazardous chemicals**: A boom in the chemical industry has also led to an increase in the safety concerns of chemical logistics as freight traffic has increased sharply. An increase in the number of untrained staff to handle packaging and transportation of hazardous chemicals and lack of awareness about the new and emerging trends and technologies are some of the issues that challenge the transportation of hazardous chemicals in India.

• **Poor transportation infrastructure**: Poor quality Indian roads and traffic infrastructure has meant increases the risks of road accidents and wastage.

• **Crossing Check Points**: Multiple stoppages increase the risks of accidents as there is an increased contact with human ecosystems.

• **Pilferage**: Pilferage is another major concern. Most chemicals are costly and are replaced by some other low value substance; moreover truck drivers are the major pilferers. This means that the raw material quality is compromised.

• **High levels of fragmentation of the industry**: A large share of the piegoes to small truck operators for bulk delivery of non hazmats wherein no such handling precautions need to be taken so they work for low value as compared to the service providers with standards set for all types of carriage handling, who suffer in this case.

• **MSDS**: MSDS (Material Safety Data Sheet) are not properly followed which result in various chemical disasters of warehouses with huge resultant losses to property and productivity.

• **Poor Storage Infrastructure**: Most warehouses are not adequately leak-proof, or equipped with security systems, palette racking and other facilities.

  • Lack of warehouse management expertise.
  • Obstacles in using intermodal transportation.
  • Increased competition among service providers.
  • Difficulty in obtaining permits for logistics infrastructure.
  • Increase in transport costs, e.g. fuel and other cost escalations.
  • Increasing (local) restrictions on transportation of hazardous goods on certain parts of transport infrastructure.
  • No wonder chemical companies prefer to partner with logistics providers with proven safety and security procedures and record. This makes it essential for logistics companies to continuously monitor all safety parameters. The consequence of any error can be grave.

**Safety Training**: Because of the potential danger involved, employees and drivers, at companies that move and store chemicals require special training. It focuses on train employees on use of PPEs (Personal Protection Equipments) train driver on how to handle the entire movement and what to do in case of any accident.
• ISO certified tanks: Tank containers are extremely safe, secure, cost-effective as well as a feasible mode of transportation. Because they are versatile and customizable, ISO tankers have become an indispensable part of transportation of hazardous and non-hazardous liquid chemicals.

• Green Transportation: Shift to greener modes of transportation e.g. intermodal transportation saves fuel and reduces CO2 emissions as well.

• Increase in R&D investment in chemical logistics as many more operational sectors to have cost advantages with boost in demand.

• Potential for high domestic demand with increasing industrial consumption.

• PCPIR Policy: PCPIR Policy is expected to attract major investments, both domestic and foreign in the petroleum, chemical and petrochemical sectors. A PCPIR would comprise of production units, public utilities, logistics and facilities for environmental compliances, residential areas and administrative services. India has identified 6 PCPIR’s, Haldia, Dahej, Vizag, Paradip, Cuddalore and Mangalore.

Important role that IT enabled-services can play to mitigate the risks associated with specialty chemical logistics:

**Enterprise risk management:** End-to-end risk management solutions to combat market risk, credit risk, and operational risk areas.

**Risk Analysis:** Analysis of contract risk, profitability, and credit and market risk, enabling better decision making.

Strong IT support can help supply chain management to grow exponentially with the help of:

• **Inventory Optimization:** Helps chemical companies reduce working capital and carry out salvaging

• **Logistics Analytics:** Enhances visibility and optimization across the logistics network, including design, distribution centers, carrier sourcing, and metrics rationalization

• **Procurement:** Offers end-to-end solutions across both indirect and direct procurement materials, focusing on measurable improvements in compliance, total cost of ownership (TCO), working capital, material and services availability, and user satisfaction.

**Conclusion:**

*In conclusion for any logistics player for chemical products the motto should be “KNOW SAFETY—NO ACCIDENTS” as it is logistics of Chemicals, this will lead to a win-win business model for all the involved entities.*
Case Study & Glossary

10. Six Sigma in a logistics company
   By Mr. Pradeep Sharma, Master Black Belt-Anexas

11. Glossary
Case Study: Six Sigma in a Logistics Company

By Mr. Pradeep Sharma, Master Black Belt-Anexas

Define:
The project was undertaken in NAQEL which is kingdom’s largest ‘door to door’ delivery service provider with over 1000 vehicles and a network of 4900 cities, towns and villages. One of the key performance factors for NAQEL was the utilization of pickup trucks, which means how many pick ups and deliveries each truck does on a given day per route vs. its capacity.

This performance indicator has never been measured, management does not know about the current utilization. Management had a feeling that some trucks/routes are underutilized and some are over utilized. Management wanted to measure the current performance of the pickup trucks and increase it by 15%.

Measure:
The data was collected for over the period of 1 month for 9 routes under the scope of the study. The method adopted to collect the data was time and motion study where time stamp was captured from the start time of the operations in the morning, time taken to segregate the shipments, then load in trucks, travel time to the first delivery point, time spent at each customer point and then further travel time to next point. Each route was covered for 7 days a week to understand the weekly pattern.

The main purpose of the data collection was following:

1. Measure the travel time between points
2. Measure the time taken to do pickup and delivery
3. Measure overall time taken to do one pickup or delivery including travel time
4. Measure the time taken to segregate shipments and load in trucks
5. Measure first point travel time (as the terminal was away from city)
6. Measure waste capacity (break time, prayer time, fatigue and other human factors)
7. Measure the actual available time to do pickups and deliveries.

Assumptions for DH01:
- Traveling time is considered at 75th percentile, so that utilization model is valid for 75% of the cases, this will include the exceptional scenarios, prayer breaks, lunch breaks and other miscellaneous breaks as well
- Apart from that, following time has been calculated which is excluded from the productive time
  - 1st Loading Time: 20 Min
  - 2nd Loading Time: 15 Min
  - 3rd Loading Time: 15 Min
  - First point travel time: 20 Min
  - 2nd point travel time to base: 20 Min
  - 3rd Time travel time to base: 20 Min
  - Total time excluded: 110 Min

Total available time: 720 Min (12 hrs X 60 Mins)
Net Productive Time (avail time – non prod time): 610 Min
Target utilization: 90%

which is equivalent to 90 min of human factors like fatigue ness, traffic jams and other benefit of doubts

Time break up: 8 hrs 30 min
- + 2 hrs Loading time at base
- + 1 hr 30 min Travel to first package delivery point
- + 2 hrs Prayer break Free 30 Min
- + 60 Min Miscellaneous like

Pradeep Sharma is a LeanSix Sigma Master Black Belt, PMP and CPHQ certified with 14+ years of process excellence. He is trained in Six Sigma at Anexas and has implemented Six Sigma and Lean in various leading organizations. Presently, Pradeep is with Anexas as Six Sigma Master Black Belt, consulting leading organizations in Middle East & India.
Case Study

Define:
The project was undertaken in NAQEL which is kingdom’s largest ‘door to door’ delivery service provider with over 1000 vehicles and a network of 4900 cities, towns and villages. One of the key performance factor for NAQEL was the utilization of pickup trucks, which means how many pick ups and deliveries each truck does on a given day per route vs. its capacity.

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Following conclusions were drawn from the study.
- The total shift time per route was 12 hours (720 min.)
- Out of which 110 min were waste capacity which includes break time, loading time, fatigues, first point travel time).
- So the net time available was 610 min and the target utilization set was to utilize 90% of the 610 minutes.
- Benchmark of every route was set by adding travel time per route (75th percentile) and 8 min of standard pick and delivery time. Followed by dividing net available time (610 min) by time taken per pickup and delivery For ex.
  - For route code DH01: Travel time = 10 min (75th %ile) + 8 Min pickup & del time = 18 min
  - Net Available time = 610 min
  - No. of possible pickups and deliveries in route DH01: 32

Performance was measured for all the routes under study using the above methodology.
Dh06, DH04, Jubail & Ops/ back route were found to be performing low as compare to other routes.
Based on the above analysis it was concluded that the average utilization of routes was 82%.

Analyze:
Further data was collected to find out the root cause of low utilization on different routes. Cause and effect diagram was used to identify the potential causes followed by control impact matrix to shortlist the potential causes. Further data collection plan was made to collect the data for the potential causes.
Based on the above analysis, it was concluded that the average utilization of routes was 82%. Further data was collected to find out the root cause of low utilization on different routes. Cause and effect diagram was used to identify the potential causes followed by control impact matrix to shortlist the potential causes. Further data collection plan was made to collect the data for the potential causes.

- Using ANOVA & ANOM it was statistically validated that pickup & delivery time on some routes, at some customer’s place & by some service providers were significantly high and low than others. They were shortlisted as the root causes.

<table>
<thead>
<tr>
<th>High Control</th>
<th>Low Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Weekdays</td>
<td>- Lost Shipments</td>
</tr>
<tr>
<td>- Pickup &amp; Delivery Time per customer</td>
<td></td>
</tr>
<tr>
<td>- Pick up and delivery time per S/P</td>
<td></td>
</tr>
<tr>
<td>- Pickup and delivery time per route</td>
<td></td>
</tr>
<tr>
<td>- Shipment offloading process</td>
<td>- Forklift Breakdown</td>
</tr>
<tr>
<td>- Shipment onloading process</td>
<td>- Flat Tyre</td>
</tr>
<tr>
<td>- Shipment Segregating process</td>
<td>- Route Type</td>
</tr>
<tr>
<td>- No Measurement</td>
<td>- Sand Storms</td>
</tr>
</tbody>
</table>

- No. of Pieces for pickup and delivery
• Using scatter plot & correlation it was validated that no. of pieces for pickup & delivery are not significant to total no. of pickup and deliveries done on that route

![Scatterplot of Pick up Delivery Time Pcs vs No. of Pieces](image)

• Using ANOVA & ANOM, it was also validated that pickup & delivery time is same for all the days of the week

![One-Way Normal ANOM for Pick up Del Time WD](image)

• No data collection or statistical validation was required for loading, offloading & shipment segregating process, as we can see in the picture, that there was no process at all. All shipments were mixed and it takes up to 45 minutes for the driver to segregate the shipments for the respective routes:
To summarize following route causes were identified for low utilization:

- High pickup and delivery time in some routes because of the customers in that route
- High pickup and delivery time for some of the drivers
- High time taken to segregate the shipment and load into truck for respective routes

**Improve:**

Based on the root causes identified brainstorming was conducted to find out the solution. Following solution was identified for each root cause:

<table>
<thead>
<tr>
<th>Y</th>
<th>X’s</th>
<th>Analysis Tool Used</th>
<th>Solution Proposed</th>
<th>Category of Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Pickups &amp; Deliveries per route</td>
<td>Pickup &amp; Delivery Time per route</td>
<td>Fish Bone Analysis Control Impact Matrix ANOVA ANOM</td>
<td>A session was conducted between the service providers to share the best practice. Low performing service providers were asked to buddy up with high performing service provider for a week.</td>
<td>Share best practice</td>
</tr>
<tr>
<td>Low Pickups &amp; Deliveries per route</td>
<td>Pickup &amp; Delivery Time at customer location</td>
<td>Fish Bone Analysis Control Impact Matrix ANOVA ANOM</td>
<td>Initiated a process by customer service to call the customer to keep the shipment ready before the pickup truck arrives. Awareness session was conducted with some identified customers to share the best practices for preparing the shipment.</td>
<td>Share best practice New Process</td>
</tr>
<tr>
<td>Low Pickups &amp; Deliveries per route</td>
<td>Pickup &amp; delivery Time by Service Provider</td>
<td>Fish Bone Analysis Control Impact Matrix ANOVA ANOM</td>
<td>A session was conducted between the service providers to share the best practice. Low performing service providers were asked to buddy up with high performing service provider for a week.</td>
<td>Share best practice</td>
</tr>
<tr>
<td>Offloading/ Loading/ Shipment Segregating process</td>
<td>Lean</td>
<td></td>
<td>Applied 5 % and visual management</td>
<td>Lean</td>
</tr>
</tbody>
</table>
• Best practice sessions were conducted with selected customers and with the service providers/drivers
• Shipment yard was painted with labels (for designated route) & with lines to control shipment, this made easy for Service provider/drivers to find their shipment and load the pickup truck. It saved 30 min per route per day

After the solution was implemented the data was collected again to validate the increase in utilization. The utilization of routes increased from 82% to 92%
Control:
- Control charts established for the overall utilization & for pickup and delivery time
- Introduced incentive scheme for service providers
- Introduced quarterly best sharing sessions for customers and service providers

![Cost & Benefit Table]

Net Profit from the project (annually) was: SAR 1378400
Information security. It details hundreds of specific controls which may be applied to secure information and currently addressed by ISO 17799 and the emerging ISO 27001. ISO 17799 is a code of practice for information security, demanding standards to address specific aspects. These are ISO 14001, ISO 22000, and ISO 18001.

ISO 22000 specifies requirements for a food safety management system where an organization in the food chain needs to demonstrate its ability to control food safety hazards in order to ensure that food is safe at the time of human consumption. It is applicable to all organizations, regardless of size, which are involved in any aspect of the food chain and want to implement systems that consistently provide safe products. The means of meeting any requirements of ISO 22000:2005 can be accomplished through the use of internal and/or external resources. ISO 22000:2005 specifies requirements to enable an organization:

(a) to plan, implement, operate, maintain and update a food safety management system aimed at providing products that, according to their intended use, are safe for the consumer;
(b) to demonstrate compliance with applicable statutory and regulatory food safety requirements;
(c) to evaluate and assess customer requirements and demonstrate conformity with those mutually agreed customer requirements that relate to food safety, in order to enhance customer satisfaction;
(d) to effectively communicate food safety issues to their suppliers, customers and relevant interested parties in the food chain;
(e) to ensure that the organization conforms to its stated food safety policy;
(f) to demonstrate such conformity to relevant interested parties, and
(g) to seek certification or registration of its food safety management system by an external organization, or make a self-assessment or self-declaration of conformity to ISO 22000:2005.

ISO 27001
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Widely accepted Quality Management Standards and Quality Technology Tools commonly in Use:

Quality Management Standards
ISO 9001
International standard for quality management, suitable for any business. Implementation involves evidence of best management practice, including health & safety performance and a commitment to continuous training and development for all staff.

‘Traditionally, organisations have always measured performance in some way through financial performance. However, performance based on cost accounting information provides little to support organisations on their quality journey, because they do not map process performance and improvements seen by the customer’.

ISO 14001
International Standard for an Environmental Management System (EMS), which involves regulatory compliance and ideally waste minimization, reduced environmental impact and reduced costs. Implementation involves everyone in the company and all aspects of its processes and products that may impact on the environment.

ISO 18001
International specification for Occupational Health and Safety Management System(OHSAS), are a set of co-ordinated and integrated process, that enable a company or an organization to be able to control the health and safety issues in an uniform and effective manner. This is suitable for any size and kind of organization.

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Quality Technology Tools

- 7 QC tools: known as ISHIKAWAS 7 QC tools which revolutionized the Japan & the World:
  - (1) 6–Sigmas
  - (2) Total Productive Maintenance (TPM)
  - (3) 7 Quality Control Tools
  - (4) Check Sheets
  - (5) Cause and Effect Diagram
  - (6) Scatter Diagrams
  - (7) Control Charts
  - (8) Graphs

- Rapid Improvement Process or Kaizen Blitz – RIP or Kaizen Blitz is an intense management program, lasting about five days, which results in immediate change and bottom-line improvements. Both operators, maintenance staff and management working together to improve the manufacturing and service-related processes, limiting the defects to 3.4 defects per million samples.
ISO 27001 is a specification for an Information Security Management System, sometimes abbreviated to ISMS. It is the foundation for third party audit and certification. It comprises 34 pages over 8 major sections. Both standards are intended to apply to all organizations, whether commercial or otherwise, and should assist anyone with responsibility for managing information security.

Quality Technology Tools

1. **6–Sigmas**
   It is a rigorous and disciplined methodology that uses data and statistical analysis to measure and improve an operational performance by identifying and eliminating “defects” in manufacturing and service-related processes, limiting the defects to 3.4 defects per million samples.

2. **Total Productive Maintenance (TPM)**
   TPM involves operators, maintenance staff and management working together to improve the overall operation of any equipment. Operators should be the first to identify noisy or vibrating motors, oil or air leaks. They can be trained to make many simple repairs to prevent major and costly breakdowns. Keeping an Overall Equipment Effectiveness (OEE) record can help to monitor performance reduction. These reports monitor three key areas – availability, performance and quality of output.

3. **7 Quality Control Tools**
   7 QC tools listed below also known as ISHIKAWAS 7QC tools which revolutionized the Japan & the World:
   - Histograms
   - Cause and Effect Diagram
   - Check Sheets
   - Pareto Diagrams
   - Graphs
   - Control Charts
   - Scatter Diagrams

4. **5S System**
   The 5S System is a workplace organization method using simple common sense methods. This is often the first step in applying Lean Techniques since it helps in getting the ‘junk’ out of the work area and set procedures to keep it that way. 5S stand for Sort, Set in Order, Shine, Standardize and Sustain. These simply mean:
   - Sort (SERI) – To remove all unneeded items out of the work area and cleaning to improve morale and safety.
   - Set in Order (SETTON) – This implies establishing and marking place / home for all needed items.
   - Shine (SESISO) – This means cleaning machines, equipment and work areas well enough for an inspection.
   - Standardise (SEIKETSU) – This involves creating standard operating procedures for all activities whether it is operating or maintaining a machine or even an office activity.
   - Sustain (SHITSUKE) – The success of the 5S System depends on maintaining it as an ongoing activity. Hence suitable rewards and recognition should be given to those complying with the above directives.

5. **Kaizen Tools**
   Rapid Improvement Process or Kaizen Blitz – RIP or Kaizen Blitz is an intense management program, lasting about five days, which results in immediate change and bottom-line improvements. Both management staff and workers are involved. Example of a RIP Schedule can run as follows:
   - Lean Training and investigation
   - Data gathering and measurement
   - Identifying possibilities and start changes
   - Continue changes and run trials
   - SOPs and Report the benefits
TQM

Total Quality Management – TQM is an enhancement to the traditional way of doing business. It is a proven technique to guarantee survival in world-class competition. Only by changing the actions of management will the culture and actions of an entire organization be transformed. TQM is for the most part common sense. Analyzing the three words, we have Total – Made up of the whole. Quality – Degree of excellence a product or service provides. Management – Act or manner of handling, controlling, directing, etc. Therefore, TQM is the art of managing the whole to achieve excellence. The Golden Rule is a simple but effective way to explain it: Do unto others as you would have them do unto you.

TQM is defined as both a philosophy and a set of guiding principles that represent the foundation of a continuously improving organization. It is the application of quantitative methods and human resources to improve all the processes within an organization and exceed customer needs now and in the future. TQM integrates fundamental management techniques, existing improvement efforts, and technical tools under a disciplined approach.

TQM requires six basic concepts:
1. A committed and involved management to provide long-term top-to-bottom organizational support.
2. An unwavering focus on the customer, both internally and externally.
3. Effective involvement and utilization of the entire workforce.
4. Continuous improvement of the business and production process.
5. Treating suppliers as partners.

It has been gathered that by implementing Quality Technology Tools like 6–Sigma, TQM, TPM in certain sectors/group of industries of small and medium sizes, the performance of the industries have improved tremendously in terms of productivity (improvement by 50 to 100 per cent in one year), improvement in quality (up to PPM level), rejections and customers complaints have come down (by 50 per cent in one-to one-and-half years durations). It is the need for the SMEs to adopt the best manufacturing practices to enable them to be competitive in the current scenario of global competition. A government initiative is required if India has to become a major manufacturing hub of the world. Some of the countries that have become manufacturing giants, like China and Taiwan have been actively supporting industries to enable them to adopt these Quality Management Standards and Quality Technology Tools and become competitive. Some of the Pilot Projects executed by ASSOCHAM, CII and others on the ancillaries of the big industrial giants in the engineering and auto sector have demonstrated that there has been considerable improvement in the quality of the products, reduction in customer complaints and rejections leading to overall improvement in business/financial performance.

LIST OF EXPERT ORGANISATIONS
• Quality Council of India and National Recruitment Board for Personnel and Training.
• Consultancy Development Corporation.
• National Productivity Council.
• Standardization Testing & Quality Certification (STQC, a Society under Ministry of IT).
• IIQM (India Institute of Quality Management).
• Industry Associations that have taken active interest in QMS/ QTT.
• Technical Institutions, Engineering Colleges, Tool rooms and similar bodies. etc.
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Published by
Transport Corporation of India Ltd.
69 Institutional Area, Sector-32, Gurgaon-122 207, Haryana, India
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