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## A Holistic Approach to Quality Success in Tata Steel

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### Abstract

Total Quality Management (TQM) is a powerful tool to guarantee organization's survival in world-class competition. Business and industrial organizations world over have exploited/ exploiting TQM, by changing the actions of management to derive and transform the culture and actions of the entire organization. With the ever-increasing competition in both domestic and international market, the emphasis on evolving effective methodologies aimed at managing the quality of goods and services has assumed paramount importance. Accordingly, "Total Quality" has been viewed as "Organizational" concept for providing best quality of products and services to the "customer", which in turn would impact the competitiveness of the organization. In this paper, principles of TQM, golden rules of TQM and implementation of TQM have been discussed. In this paper, implementation of TQM in Tata steel, challenges and hurdles regarding implementation of TQM in Tata steel, major steps taken by Tata steel for implementing TQM and benefits of TQM implementation in Tata steel have been studied.

**Key words:** Total quality management, statistical quality control, knowledge management.

### Introduction

Total Quality Management (TQM) is a holistic model which uses a multidisciplinary approach to quality, statistics to improve work processes, managerial skills to improve the human components of production and a customer centered focus to deliver the product as per the customer wants or needs. TQM is basically a management theory for "enhancing competitive performance by improving the quality of products and

processes.”An increase in quality leads to higher productivity through less rework, rejects and waste. This leads to lowering of costs and customer complaints. Quality is achieved through continuous improvement of all activities of the organization, which shows that it is long-term than a short-term strategy. Under TQM, emphasizing the quality of the product or service predominates. TQM extends beyond statistical quality control (SQC) to embrace a wider scope of management activities of how we manage people and organizations by focusing on the entire process, not just simple measurements. Bell laboratories in 1931, became concerned with the economic control of quality of manufactured products and with the formulation of criteria for determining when numerical data in statistical control. Shewart (1931) has pointed out that

- All process and systems exhibit variability
- Variability may be caused by either random or special causes
- Special causes must be eliminated before implementing process changes to improve productivity

According to Prof. J. Oakland (1993, 1991), TQM is a way of managing to improve the effectiveness, flexibility and competitiveness of a business as a whole. It applies just as much to service industries as it does to manufacturing. It involves whole companies getting organized in every department, every activity and every single person at every level.

According to Cullen and Hollingum (1987), TQM is a zero defects in products leaving the factory and in the services.

According to David (1992), TQM is the process which seeks to meet and satisfy customer requirements throughout the whole chain of internal and external customers and suppliers.

According to Department of Defense, USA (1988), “TQM is the application of quantitative methods of human resources to improve the materials and services, supplies to an organization, all the processes within an organization and the degree to which the needs of the customers are at present and in future”.

Thus, TQM is a comprehensive management system which focuses on meeting producers/customers needs by providing quality services at a lower cost that provides value to the producers/customers and also on the way tasks are accomplished. It is an integrated organizational approach in delighting both external and internal customers by meeting their expectations on a continuous basis through everyone involved with the organizational, working on continuous improvement in all products, services and procedures along with proper problem solving methodology. TQM as a corporate business recognizes that customer is inseparable and it is applicable within in both industry and commerce.

## **Principles of TQM**

Total Quality Management represents a set of management principles that focus on quality improvement as the driving force in all the functional areas and at all levels in a company/organization. These principles are:-

- The customer defines quality, and customer satisfaction is the top priority.
- Top management must provide the leadership for quality.

- Quality is a strategic issue and requires a strategic plan.
- Quality is the responsibility of all employees at all levels of the organization.
- All functions of the company must focus on continuous quality improvement to achieve strategic goals.
- Quality problems are solved through cooperation among employees and management.
- Training and education of all employees are the basis for continuous quality improvement.

### **Golden Rule of TQM**

There are ten golden rules of TQM they are as given below:-

- Trustworthy
- Accountable
- Proficient
- Reachable
- Well-mannered
- Credible
- Communicative
- Safe
- Forceful
- Attractive

### **TQM Implementation**

The process of TQM implementation basically starts from the top followed by the top down strategy. First the top management must be convinced to adopt TQM. They have to inculcate and indoctrinate the flavor and fragrance of TQM down below. The pillars of TQM are organization, products, commitments, leadership and process. While implementing TQM considering of these pillars becomes unpreventable.

**Organization-** The organization must emphasize on total employee involvement (TEI) and work based design. A holistic management system is required that blends the principles of TQM into one and all aspects of the organization.

**Products-** Attention must be given onto the processes as quality of the product is impossible without quality of the process.

**Commitment-** Management control system implying the utmost need of top management commitment.

**Leadership-** Leadership is required for coordination in continuous improvement. An organization without leadership can be compared with a naval ship without radar.

**Process-** It defined as a set of interrelated activities. Quality must be ensured in the processes by way of right leadership. Statistical process controls (SPC), statistical quality control (SQC), materials requirement planning (MRP), just in time (JIT) are few examples of processes.

While implementing TQM, the organizations should have considered the following factors. They are as given below:

- TQM comes through people
- Depends upon the three S's like strategy, structure and system
- Give more emphasis on four S's like staff, style, skill and shared values
- There should be flexibility in all the systems.

### **TQM implementation in Tata Steel**

Tata steel was established in 1907 as Asia's first integrated private sector steel company, and it (including Corus) is the world's sixth largest steel producer with a crude steel capacity of over 28 million tones(2008-09). It is now the world's second most geographically diversified steel producer, with operations in 24 countries and commercial presence in over 50 countries. The Tata Steel Group with a turnover of USD 33 billion in 2007-2008 has over 82,700 employees across four continents. Tata Steel India becomes the first integrated steel company in the world, outside Japan, to be awarded the Deming Application Prize for excellence in Total Quality Management. The company has won the award for the year 2008. Tata Steel has been practicing TQM since the late 1980s which was when the company initiated several quality activities like quality circles, ISO certification, quality improvements using Juran methods, etc. In 2005, Tata Steel conducted a TQM diagnosis along with the JUSE team (Union of Japanese Scientists and Engineers) that gave the company the status of its TQM implementation and helped it to uncover a lot of areas that required improvement in both processes and culture. The TQM diagnosis gave the company deeper understanding and clarity on its approach to quality like what areas should be addressed, who should get involved in what activities, etc. The company specifically looked at:

- Strategic aspects or policy management by relooking at the balanced score card and looking at areas needed to change the business etc
- Daily management by managing the day-to-day operations, ensuring that they are stable and looking for incremental improvements etc
- People involvement through involving people in thinking about improvement activities such as quality circles, suggestion management and knowledge manthan etc.

### **Challenges and hurdles regarding implementation of TQM in Tata steel**

The most fundamental challenge was to create a positive approach that looks at improvement activities as essential for achieving targets and goals. The biggest challenges lay in creating this understanding across the organization, dealing with 35,000 employees, in explicitly stating and documenting improvement targets and how to go about achieving these in a systematic manner, in standardizing approaches and creating alignment to profits and goals, and so on. Equally challenging was to bring quality to the forefront, which was addressed by formulating customer focused

objectives and strategies in the various divisions and departments. Tata Steel have setup six examination units for solving problems such as the corporate unit and the five major divisions (raw materials, coke, sinter and iron, flat products, long products and shared services). Each unit had two applications one for the overall unit, and another who represents each of the departments of the division. The company has created guidelines and reference manuals for making uniformity and alignment.

### **Major steps taken by Tata Steel for implementing TQM**

There are some major steps taken by Tata Steel for implementing TQM they are as given below:

#### **Understanding customer needs**

Integrated steel plants are capital intensive with a long payback period. It is natural therefore, for steel plants to maximize capital productivity through volumes. Like any other steel plant in the past, Tata Steel, the integrated steel plant had basically focused on internal factors like cost and volumes. With its growing understanding of TQM and Theory of Constraints (TOC) on the journey towards the Deming Application Prize, its customer focus and approach to the market has undergone a significant change. It started changing the levers of improvement from an internally focused efficiency driven culture to a culture of value creation with customers and suppliers.

Tata Steel had started some specific approach in the market such as Customer Value Management (CVM), Retail Value Management (RVM) and Solution for Sales (SFS). These approaches generally focused on the “needs” rather than “wants” of the customer. It is important to note that these approaches were continued or initiated in a supplier’s market condition when the steel cycle was on a high. In a downturn, it is often tempting to chase sales. This inevitably results in a price war which is detrimental to the organization and the industry. The objective therefore should be to create value for the customer or in other words, should help the customer make money. The assumption that the customer makes money when prices are low can often be unfounded. The journey towards the Deming Application Prize using TQM provided a deep insight of the needs of the customer and how to capitalize on the need without jeopardizing mutual interests. Mirroring the CVM process, Tata Steel initiated the Supplier Value Management (SVM) programme with its key suppliers, which also works on the ‘one firm concept’ with the objective of mutual value creation. Similarly, focused approaches to improve and effectively manage raw materials have been undertaken with the objective to maximize the use of captive resources.

#### **Infrastructure strengthening**

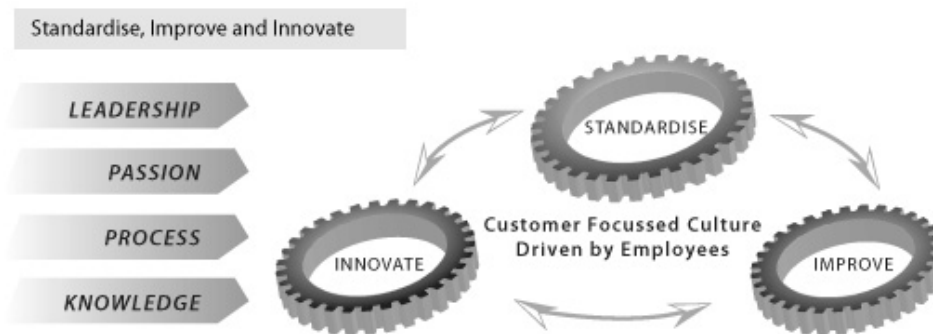
Since the weaknesses in the daily work management system are not focused upon which later are exposed even during mild storms in the market or economy. Vigorous daily work management practices, a clean and safe work environment and consistency and stability of processes are essential building blocks to weather the economic storm. A robust base is essential to improve and sustain gains. The road to the Deming

Application Prize emphasized the importance of a robust base and the process of ensuring deployment of the same.

### The improvement philosophy

The company's ASPIRE (Aspirational Initiatives to Retain Excellence) technique helps to set goals and choose the appropriate tools. ASPIRE is a new HR programme aims to combine tools of best practices and improvement methodologies. Under this, certain parts of the planned improvements are checked for causality, explored for means (causes) and then the implementations are carried out using differentiated tools and techniques. For the remaining parts of the aspirational goals the means are innovated as we proceed in the implementation journey.

The future belongs to organizations that can increase the pace of standardization (to have a robust base), improve quickly on their current operations and continuously innovate to differentiate themselves from the rest. This can only be achieved by leadership, passion, process and knowledge. Tata Steel's TQM journey has made it acknowledge the fact that the only sure way to prosperity in the long run, is to ensure value creation for the system as a whole, starting from the customers to the suppliers.



### Performance improvement in the Tata steel group

Tata Steel was set up the Performance improvement committee (PIC) in January 2008 to drive performance improvement on a continual and accelerated basis. The framework and structure of the PIC was finalized, with Performance Improvement (PI) Groups for iron making, steel making, flat rolling, long rolling, maintenance, distribution service centers and building systems. RD&T also represented in most of the PI teams under each of the groups. Initially, projects were identified with bottom-line impact of \$180 mn, of which 30% were cost projects and the balance were throughput (volume) related. With the change in market situation in H2, the sites reworked their projects and now cost related projects comprise 40%, though the total benefits have reduced to \$ 150 mn.

### Early success areas

There are some areas where Tata Steel makes continuous improvement. It includes:

- Higher usage of processed reverts at Scunthorpe and Port Talbot
- Reduction in hot metal manganese at Port Talbot
- Bottom stirring at IJmuiden leading to improved converter life and yield

- Higher usage of Low Cost Carbon Source (LCCS) in the blend at Ijmuiden, Port Talbot and Scunthorpe
- Vessel life improvement at Jamshedpur and Scunthorpe
- Blast Furnace and Coke Ovens operating process for lower production levels developed and successfully implemented in Tata Steel European operations without compromising equipment health and safety

### **Coke self sufficiency**

#### ***Coke oven availability improvements***

- Improvement in caster speed at LD2, Jamshedpur by implementing shop tracking system
- Improvement in HSM productivity, Jamshedpur by mill pacing model and effective shutdown management
- Improvement in PLTCM productivity at CRM, Jamshedpur by looper optimization

### **Change in performance culture**

The Performance Improvement (PI) journey has resulted in some positive changes in the performance culture:

#### ***KPI comparisons***

Each PI team has identified its top three to seven KPIs which are being tracked and compared across sites each month commencing from July 2008. Such KPI comparisons have led to discussions on areas where there have been significant performance gaps within the Group and often, these have resulted in improvement project opportunities.

#### ***Bottom line orientation***

Most of the projects were being identified with a view towards impacting bottom line improvement and most of the projects are conceptualized along with an expected financial benefit.

#### ***Knowledge exchange with a purpose***

Within the PI teams, knowledge exchange was principally to address common operational issues, address common weaknesses and pain areas and significant KPI gaps. For example, Blast Furnace PIT and Coke PIT have discussed how to manage operations at lower production levels in a safe manner and without damaging the equipment. As part of the agenda, the PIC meetings drive specific knowledge exchange opportunities.

#### ***People involvement (PI)***

The PI Team (PIT) meetings and the resulting project opportunities have had a positive influence on involving more people at each site in taking on improvement projects and participating in PIC / PIT reviews. With a legacy of over 100 years, Tata Steel already had practices in place to manage its operations and situations. In the last twenty years, it has explored and practiced a number of improvement initiatives with



TQM forming the holistic approach to manage its processes by quality. Tata Steel believes that this approach will ensure sustainability while continuously improving its current practices to keep pace with changing market requirements.

It constantly strives to break away from the common place and to set new industry benchmarks for others to emulate.

### **Benefits of TQM implementation in Tata Steel**

TQM implementation has helped Tata Steel in reducing production cost and the cost of production of a tonne of saleable steel has dropped by 2.5 per cent. The implementation was launched at the raw material stage. The improvement of the working of the coal washeries has brought down ash content in domestic coal, sourced from the company's own West Bokaro and Jharia collieries, from 17 per cent to 13 per cent (at West Bokaro) and from around 18 per cent to 15 (at Jharia). Thus, the company's dependence on imported coal has declined. Now, the company has been using 70 per cent domestic coal (earlier it was 55%). It also helped Tata steel in improving productivity of blast furnaces (1% drops in clean coal ash leads to a cost saving of about 5% in the production of hot metal and overall productivity improvement of about 2%). Another innovation has been introduced in the use of coal. Instead of lumpy coal, middlings and coal in small particles are being injected into blast furnaces as a result the costlier coke route has been dispensed with wherever possible. The raw materials division kept pace with the production units with the OMQ (Ores, Mines & Quarries). The raw materials division producing highest ever iron ore at 10.72 million tonnes (previous best 10.29 million tonnes in FY 08). Jharia collieries also recorded highest ever production of raw coal (1.58 million tonnes over 1.48 million tonnes in FY 08).

In iron ore, Tata Steel is 100 per cent self-reliant. However, the quality, particularly, the high alumina content, as high as 2.5/2.6 per cent and it has been possible to bring down the alumina content to two per cent by introducing the jigging process. All these exercises have been undertaken for achieving stability in the operations of the blast furnaces requiring consistently good supply of raw materials.

Tata Steel was modernizing its blast furnaces with the help of in-house expertise, and the 'H' blast furnace was considered the most modern in India. In fact, if the capacity of the Jamshedpur plant increased by about 1.8 million tonnes in the past one and half years (due to modernization of the furnaces). Hot metal production in FY 09 was up by 74000 tonnes as compared to FY 08, achieved mainly due to the superior performance of the newly commissioned 'H' blast furnace. Prudent selective operation of the blast furnaces helped the Company to lower its cost of production of hot metal without affecting the crude steel output. The 'H' blast furnace, despite the delayed startup, has surpassed its FY 09 target by 0.3 million tonnes in its very first year of operation. Various production units including the sinter plant, LD#1, slab caster and new bar mill achieved record production during the year. The Company bettered its Specific Energy Consumption record set last year by achieving 6.594 GCal per tonne of crude steel as against 6.655 GCal per tonne of crude steel in FY 08.

CO<sub>2</sub> emissions reduced to 2.09 t/tonne of crude steel as against 2.146 t/tonne of crude steel in FY 08, an improvement of 2.61%.

The Company's continuing focus on safety resulted in a 10% reduction in Lost time injury frequency (LTIF) rate in the works and an 80% reduction in the Raw Material division as compared to the previous year. The Fatality Risk Control Programme was rolled out successfully across all the divisions during the year. More than 1168 fatality potential conditions were identified and corrected with irreversible engineering solutions.

The company's TQM initiatives are not limited to manufacturing processes only but also extend to selling finished products in a competitive environment. The flat products account for 70 per cent of the production of Jamshedpur plant and the company, it was claimed, was the single largest supplier of skin panels for the automobile sector, accounting for an estimated 40 per cent of the market.

The Long Products Division was awarded the prestigious certificate by CARES, UK for superior quality rebar's. These rebar's guarantee a minimum of 5 million cycles of fatigue strength. Tata Steel Limited was the only rebar manufacturer in India to be awarded this accreditation.

## **Conclusion**

Business competition is fierce and getting fiercer. Manufacturing companies recognize that product quality is an important variable in this competition. Many manufacturers for quite sometime enjoyed the benefits of sellers market. Now, the markets are flooded with many products of all types and qualities to suit the needs of big and small customers. An effective business strategy must provide for continuous improvement of product quality. Management shall aim at better quality which results in higher productivity by correcting current practices like sets objectives, executes the plan, checks the results and takes necessary measures. It is important to involve all the employees irrespective of hierarchical status in the formulation and execution of quality function. Quality, in today's global competitive environment, is no longer a "luxury". It is a necessary ingredient for success. Quality has a significant impact on the return on investment and market share of all business. Thus, TQM helps organization in increasing sales, productivity, improving product quality, improving profitability, improving employee morale and reducing customer complaints by improving process capabilities.

Thus, Tata steel has implemented TQM by using certain steps like understanding of customer needs, by strengthening infrastructure, by improving the thoughts, by performance improvement and through people involvement. This leads to a significant development in all the areas especially in coal production, steel production and also increased selling of finished products in a competitive environment. Thus, Tata steel has been using 70 per cent domestic coal, the raw materials division has producing iron ore at 10.72 million tones, hot metal production in FY 09 was up by 74000 tonnes as compared to FY 08 achieved mainly due to the superior performance of the newly commissioned 'H' blast furnace, CO<sub>2</sub> emissions reduced to 2.09 t/tonne of crude steel as against 2.146 t/tonne of crude steel in FY 08 and also continuing focus on safety resulted in a 10% reduction in LTIF rate in the works. According to Avneesh Gupta,

TQM chief of Tata steel, Tata has targeted to save around Rs 600 crore for the financial year (2008-09) due to the improvements in the work processes after implementing TQM not due to effect of market prices or impact of raw material costs.

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