

TOTAL QUALITY MANAGEMENT IN TYRE MANUFACTURE INDUSTRIES

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Abstract:- In the world, the current and turbulent manufacturing environment has forced many companies that compete globally to implement Total Quality Management (TQM) which is presently now one of the global theories adopted by the companies to derive competitive advantage from the potential market. This paper reflects on the Organization concentrating particularly focus on General Tires and Rubbers Company (GTR) that how this organization is operating in different countries. Implementation of TQM has produced extra ordinary results and GTR is expected to receive its benefits gradually, after all its processes will be improved and wastage factor will be reduced, which will result in overall products improvement.

Keywords:- Total Quality Management, Business, Processes, Products, (GTR) General Tires and Rubbers.

1. INTRODUCTION

American industry sought assistance from TQM pioneers Seward, Deming and others and won the war. With the passage of time they forgot the teachings of these pioneers. Despite lack of resources after the post war situation, Japanese used to import more than 90% of raw material at that time and were totally out of business. During that period they sought help from Deming, Juran and other quality gurus and these scholars gave the same lesson to Japanese. They embraced this approach and again came-up with the industrial base and became business leader. The America, which was leading the business world with its products, was not able to retain its own markets.

The Japanese with new methodologies snatched each and every market not gradually but rapidly specially in the field of electronics and automobile industry. The TQM philosophy is a guiding force in other industrialized nations notably Japan, although its recent travel to Europe, central Asia, and the Middle East shows TQM has indeed become a worldwide concept. TQM encompasses the entire organization, from supplier to customer. TQM stresses a commitment by management to have a continuing company-wide drive toward excellence in all aspects of products and services that are important to the customer.

2. EVOLUTION OF TQM

TQM is an approach for improving the competitiveness, effectiveness and flexibility of a whole organization. It is a way of planning, organizing and understanding each

activity and depends on each individual at each level. TQM is a way of bringing everyone into the processes of improvement. TQM is anchored to organizational culture because successful TQM is deeply embedded in virtually every aspect of organizational life. Personal commitment to

continuous improvement should become a daily issue. Total Quality Management is a philosophy, an attitude of mind, and a journey not a destination. It is supposed to help win customer confidence and ensure long-term profitability.

TQM stands for quality of construction in every area including design, production, purchase, seller relationships, inspection, after sales service, market research, development, financial controls, staff rewards, training and education. The emergence of the total quality management philosophy makes sense to understand some of the underlying concepts that have guided our industrial development gives a clear picture of the evolution of TQM. The concept of quality control as a distinct discipline emerged in the United States in the 1920s. At that time, quality control was simply intended to control or limit the creation of defective articles in industrial processes.

Prior to the concept of quality control, the first idea of quality control was to inspect the output of a manufacturing process and then sort the defective products from the good ones. The concept of quality control arose in the first half of this century and after that there were numerous refinements. The work of Shewhart, Deming, Juran, Feigenbaum, Crosby and others indicate that there was a better way to approach the concept of quality control. Simply classifying good products from bad ones was not the most efficient way of ensuring quality production; a better way should be developed [8]. They also recognized that the concept of quality control should not only be limited to manufacturing processes, but the idea of a more effective management philosophy should also focus on ensuring quality in administrative processes and service industries.

The driver are ultimately enforced by the Tire alone, therefore the quality and design of the Tire is important. The air inflated rubber tube holds the entire weight of the car, but the rubber tube cannot directly come into contact with the road as it cannot withstand wear and lacks strength. The Tire covers the rubber tube. Tire must perform a certain number of functions for proper operation of the vehicle, i.e. steering, carrying a load, damping, rolling, drive transmission and long life. Steering: Tire must drive the vehicle accurately, regardless of road surface, weather conditions.

The stability of the trajectory of a vehicle depends on the ability of the Tire to maintain its course while maintaining proper traction with the road. It must be at the height of the transverse forces without moving away from its path. Load Loading: Tires should carry lots of weight usually more than 50 times their own weight, not only when on the move, but also at rest. The car usually weighs about 1.6 tons and the contact area of a single wheel with the road is a postcard size. Therefore, each tire experiences compressive stresses of the order of a few MPa.

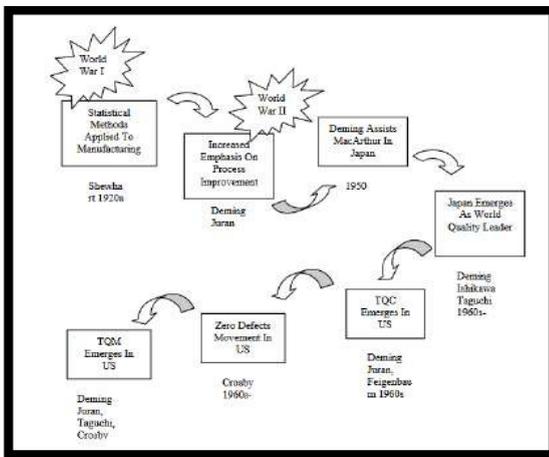


Figure 1 The emergence of TQM

TQM Organization	Traditional Organization
1. Customer driven	Company driven
2. Long-term oriented	Short-term oriented
3. Data driven	Opinion driven
4. Elimination of waste	Tolerance of waste
5. Continuous improvement	Optimization
6. Prevention	Inspection
7. Employee participation	Top-down hierarchy
8. Problem solving	Blame imposing
9. Leadership	Management

Table 1. Comparison between TQM and traditional organization

Tire is the only point of contact of the vehicle with the road. The intentions of Damping: Tires absorb shock due to obstacles or irregularities present on the surface of the road, providing a comfortable ride to the passenger, as well as ensuring a long life of the vehicle. The main feature of the tire is its ability to yield when tension is applied and return to its original shape when stress is removed, with the tire lasting, or in other words maintains its optimum performance level for millions of wheel revolutions. The wear of the Tire depends on its conditions of use (load, speed, road condition, vehicle condition, driving style, etc.), but All the quality of its contact with the ground. Pressure therefore plays a major role. e stress cycle occurring at very high frequencies.

Transmitting Drive: Tires transmit drive the engine's usable power, braking effort with the help of the friction. quality and efficient design of the tire helps in making complete use of engine's power and braking facility.

Long Lasting Life: Tires should be able to give performance for millions of revolutions. Life of a tire depends on quality of contact with the road, load, speed, driving style etc.

Constant improvements in rubber chemistry and tire design are creating exciting tires that offer greater mileage and

performance in extreme weather conditions. Manufacturers offer tires estimated to last up to 80,000 miles. Treads, designed and tested by computer, now feature unique asymmetrical bands for improved traction and safety on wet or snowy roads. Design engineers are also experimenting with non-pneumatic tires that can never go flat because they don't contain air under pressure. Non- pneumatic tire is simply one slab of thick plastic attached to the wheel rim. The plastic curves out from the rim to a point where a rubber tread is secured to the plastic for contact with the road. Tire offers lower rolling resistance for greater fuel economy and superior handling because of a greater area of contact between tread and road.

Quality is highly valued attributes which has received increasing attention in the recent past. Many companies have embraced quality as a management thought. Quality image once obtained can enhance a company's ability to compete globally and it is a long-term opportunity for greater success. Quality management should be a part of company strategy to compete and also to position itself efficiently in the global market. There has been an awakening among the manufacturing companies to produce high quality products and services to effectively embark upon the challenges posed in the global competitive environment. India is in vulnerable situation on the total quality.

The changing demand of global customers has made corporates all over the world to adopt quality practices aggressively. Tire industry in India continues to meet these challenges. This has necessitated the industry to accept the quality initiatives, such as, ISO-9000 and QS-9000 accreditation and implementation of total quality management. Many companies have claimed that there is a significant product quality improvement because of these quality initiatives. Compelled the management of Indian companies to adopt newer tools and techniques that would help in maintaining and improving strategic position in the market. Rapidly changing, highly competitive and interdependent world market calls for a transformation through TQM.

The future is expected to see many strategic alliances among the domestic and global players to enable themselves to have easy access to latest technology and expand their distribution network. A better distribution will also ensure easy availability.

The introduction of newer auto models will significantly have a bearing on the demand for tires. The tire companies may also be seeking for tie-ups with the OEMs for better stability and long-term relationships. The Government's emphasis on improving the roadways infrastructure will facilitate the road transport sector that in turn will brighten the prospects of the tire industry in the coming years. There is a need for independent empirical investigation of various quality initiatives of tire manufacturing companies. This study is undertaken to examine these quality initiatives with a focus on and total quality management in Indian tire industry. During the past few decades, the world has gone through a series of economic changes. These changes have reformed many economic policies. The impact of this reformation headway

has been felt in every sector of the global economy, including manufacturing sector. The significant change in the global manufacturing sector is the quality revolution. Nothing is predictable in this changing world, but one thing is certain i.e. change. Necessary adaptations have to be made keeping an eye to the future. The rationale behind undertaking this research was to study the extent of implementation of total quality management practices and its impact on quality performance in Indian tire industry.

Effective leadership modulates the implementation of total quality management. However, quality management movement will be rendered unsuccessful if there is inadequate dissemination of information from the top management. Sharing of information about the organization related to operational, strategy related issue, financial or any inter-departmental information has to be disseminated among the employees. The study suggests a proper channel for information flow throughout the organization to espouse the improvement process effectively.

A successful TQM implementation requires extra-role behavior with human resources focus. The tire industry should harness human resource to achieve business excellence. For this the study suggests a need to shift in the focal point by empowering the employees to meet the organizational performance and quality objectives. The difference among the individuals is the primary source of creativity and innovation that leads to a major competitive advantage. Employee involvement shall be made effective by involving employees from all levels in team work, by linking cross-functional teams to disseminate and share information.

Thus the tire industry should involve employees by creating an environment for personal and organization's growth as well as in gaining the competitive advantage. Rewards and recognition must be instituted to support the TQM implementation. These should foster the TQM movement among the tire manufacturers. Optimal utilization of human resource is possible by proper employee motivation and career development programmers. The organizations should maintain a safe work environment by continuously improving the potentially unsafe areas; assess societal responsibilities by creating an ambience of environmental friendly and implement energy conservations methods.

3. PROCESS MANAGEMENT

Process management as the behavioral and structured principal that is imperative in managing the process rather than the outcomes. Process management emphasis, on adding value to a process eventually increases productivity of every employee of the organization and thereby enhancing the quality. However, how businesses strive to be successful by encouraging the need of innovation of knowledge, creativity in improving the process and its optimization. Process management in Indian tire industry encompasses the identification of key processes and its impact on the business, collection of information from the entities of the organizations and systematically manages the process standards. It also emphasizes on the use of statistical techniques to control and improve process capability and product characteristics and

identify and control the implementation of process changes to ensure predicted results. Process management ensures continual improvement. The Indian tire industry should emphasis on adding values to the process, increase quality levels by reducing time and cost at all levels of processes.

4. HUMAN RESOURCE FOCUS

The people are most important asset in present knowledge-based economy. Both knowledge and human resources are being looked upon as the main force of multifaceted business environment. Manage knowledge is to manage people; to manage people is to manage knowledge. Quality awareness cannot be enhanced if human resources are not focused in a right direction. Maintaining of high quality depends on the best use of talents and their abilities. The dimension human resource focuses on the development of human resource potentiality, employee empowerment and to create an environment conducive for quality excellence. It enforces high employee performance through recognition and reward system, maintains a safe work environment, assess social responsibility with different levels of organization.

It also describes employee motivation and career development for optimum utilization of human resources. The study shows that except the first and the third sub-item of human resource focus dimension, all the other sub-item are low average (3.82, 3.84, 3.84, 3.79, 3.82) compared to the overall average 3.87. There is a setback in the mean scores of human resource focus dimension. Tire industry being labor oriented sector, the study shows that less emphasis has given to human focus expect providing a safe working environment.

It is felt from the survey that the Indian tire industry overlook human resource aspect.

5. MEASUREMENT ANALYSIS & KNOWLEDGE MANAGEMENT

The information and analysis - which lies within the extent of management and the utilization of data and information to focus on customer, ensure greater quality control and improve performance of a firm. Information and analysis are sensible elements of knowledge management.

Information plays a vital role as a mechanism for reflection, helps employees in a firm to collectively deduce the available information by lending support to the different forms of channels for negotiations and conversations. Quality management will be futile if there is inadequate dissemination of information. This dimension describes how the Indian tire companies collect information and its integration of various constituencies.

It also explains the analysis of the information and makes availability of such data and information for planning and improving performances. The data and information so elicited shall be shared among the different functional levels of the organization. Integration and utilization of data and information to support organization's decision-making stands at a low mean score of 4.05 along with 4.08 on "ensures the availability of data and information for planning and improving performance" and "shares the data and information to quality and operational performance with employees". The

study shows that there were fewer consensuses among the respondents. A proper system has to be emphasized for the flow of information and data gathered for effective implementation of quality improvements.

6. TQM PRESENT APPROACH

An online automatic inspection system for measuring the tire geometry has been proposed with the dedicated machine vision design. The tire geometry, including cutting edge, angle To detect all the lines in an image accurately and at a high speed, we propose a sequential line matching algorithm with the Line Detection with a Priori (LDP).. The experimental results show that the speed is less than 20ms per image under the Lenovo T410s. To robustly and accurately measure the tire geometry, laser lighting is introduced. Laser light is cast to the tire surface from a small incident angle, which can robustly refine the location of the tire edge in an image. With the guidance of laser, the edge of the tire is accurately identified.

7. CONCLUSION

It is observed that with the input of the standard tire model geometry, Line Detection with a Priori (LDP) is conducted to locate the candidate lines of interest in a high speed. Laser light is cast to the tire surface from a small incident angle, which robustly refine the location of the tire edge in an image. Lines of the sequential images of a tire object are matched based on their orientation and distance in the Hough space. Lots of experiments in Indian tire show that, the proposed system can inspect the tire geometry consistently with the human measurement and at the same time reduce the time of measuring to 20ms. It is promising for the industrial applications of high-speed measurement of accurate geometry with low cost constraints. On the basis of above facts, we are presenting here the conclusions, which we feel, if adopted in GTR, would be profitable to organization.

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