

# Performance of Total Quality Management in Manufacturing Industry to Increase Production Rate

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**Abstract-** The main objectives in implementing Total Quality Management (TQM) in any organizations are to ensure their products manufactured or services provided shall satisfy their customers' requirements and needs. Therefore, the level of awareness of TQM has increased considerably over the past few years. Due to this reason, the objectives of this research are carried out to investigate the level of TQM implementation and to pinpoint areas lacking in implementation in a manufacturing industry. A case study on a TQM project in a manufacturing industry is formulated and presented. The objective of this thesis is to study the application of some important TQM tools and techniques subsequently study the benefits gained through implementation of these tools. The analysis will be carried out on the basis of research on TQM in the practice, pointed out in literature by different authors in this field. The finding shows that productivity of RPS assembly line YAD model improves by increasing the production rate from 77% to 99%. The evidence presented shows that companies that do adopt quality cost model are successful in reducing quality costs and improving quality for their customers.

**Keywords-** Total Quality Management, Manufacturing Industries, Customer Satisfaction.

## I. INTRODUCTION

The manufacturing industry has experienced an unprecedented degree of change in the last three decades, involving drastic change in management approaches, product and process technologies, customer expectations, supplier attitudes as well as competitive behavior. In today's highly dynamic and rapidly changing environment, the global competition among organizations has led to higher demands on the manufacturing organizations. With increased global competition, attention has been shifted from increasing efficiency by means of economies of scale and internal specialization to meeting market condition in terms of flexibility, delivery performance and quality.

A detailed case study on a TQM project in JTEKT India limited is formulated and presented. JTEKT India Limited is a part of JTEKT Corporation Japan and operates as part of JTEKT Group India. It is engaged in the business of manufacturing / production, supply and sale of steering systems. JTEKT India Limited was founded in 1985 as Sona Steering Systems Ltd. Its first manufacturing plant is situated in the city of Gurgaon about 35Km. from New Delhi, the capital of India. In this the concepts of TQM work, culture in India and other countries has been taken from various journals and articles discussed and also attention towards case study have also appeared. A brief review of Total Quality Management techniques is also discussed from various articles and journals

## II. LITERATURE REVIEW AND ISSUES OF OLD ARTICLES

**Yusof, et al. (2014)** presented the case studies conducted in four companies, in which all have implemented TQM. The survey shows a wide range of quality initiatives has been implemented by all of them. From this study, it was found that some similarities were observed between the case companies with regard to their approaches towards excellence. People focus was one of the key drivers for changing the culture. The study revealed that continuous improvement should be focused on harnessing the potential of all available human resources within an organisation and initiating new techniques without waiting for customers demand. The report concluded that the manner in which these companies have implemented TQM was primarily customer-driven.

**Antony, et al. (2014)** provided an empirical study on the identification of critical success factors (CSFs) of TQM implementation in Hong Kong industries. A total of 11 success factors with 72 variables were considered in the questionnaire. These items were empirically tested by data collected from 32 companies in Hong Kong. A factor analysis was carried out that identified seven CSFs with 38 elements of the implementation of TQM. These factors were shown to be reliable and valid and offer new insights into the understanding of TQM success factors in Hong Kong industries.

**Das, et al. (2014)** identified the nine TQM implementation constructs and one outcome construct. A stepwise regression model is then used to identify the

primary implementation construct regression that significantly influence the outcome construct. The finding of this research is that five of TQM principles, customer focus, continuous improvement, top management commitment, employee involvement and product innovation are significantly and positively related to product quality.

**Shenawy, et al. (2015)** provided an integrate findings of empirical studies regarding the effect of total quality management (TQM) on competitive advantage. The study suggested a model for TQM that incorporates five major components: top management commitment and leadership, teamwork, culture, training and education, and process efficiency. Each of these leads to achieve competitive advantage. It helps to generate the path forward for a worldwide applicable theory of TQM by identifying and empirically testing a collective of viable components of effective TQM programs. It guided managers to what are the most effective components they should solicit in any quality program they intend to adopt.

**Das, et al. (2015)** provided a reliable and valid constructs of total quality management (TQM) and a measurement instrument in the context of manufacturing industries in newly industrialized countries for evaluating the TQM implementation process and to target improvement areas. It identified ten reliable and valid TQM constructs. Nine are implementation constructs and an outcome construct. These constructs have a total of 52 items, fewer compared to other instruments available in the TQM literature, with higher reliability compared to them. Quality/production managers will be able to use the instrument to evaluate their TQM implementation initiatives and identify problem areas requiring improvement.

**Bhat and Rajashekhar (2015)** identified the barriers of total quality management (TQM) implementation, in order to make them known to the managers of Indian industries. The findings of this survey suggest that the most important TQM barriers in Indian industry are: “no benchmarking of other company’s practices” and “employees are resistant to change”. The barriers identified in this paper can be used to help guide Indian managers while implementing TQM in their organizations.

**Kumar, et al. (2016)** analyzed the various factors important for total quality management implementation in various manufacturing organizations and to assess their relevance for Indian manufacturing organizations. The finding showed that customer satisfaction must be the prime objective for various industries to achieve total quality management. This paper is useful for manufacturing as well as service industries that are in the starting phase of TQM implementation or have already failed to implement TQM at their works.

**Fotopoulos and Psomas (2016)** determined the relationships between the total quality management (TQM) factors and organizational performance. TQM factors revealed by the study were the quality practices of the top management, employee involvement in the quality management system, customer focus, process and data quality management and quality tools and techniques implementation. These factors significantly affect the company performance with respect to their internal procedures, customers, market share and the natural and social environment.

**Shahin and Dabestani (2016)** examined the feasibility of implementing TQM based on soft factors, which can influence the successful implementation of TQM. It showed that committed leadership, closer customer relationship, benchmarking and process improvement have the most correlations amongst the TQM soft factors. Training is the only factor which is not correlated to other soft factors. Leadership has also the highest value among the soft factors.

**Khanna, et al. (2017)** investigated a critical success factors (CSF’s) of total quality management (TQM), and to rank these in the Indian manufacturing industry. It identified ten CSF’s as a part of a TQM process to increase a company chance of success in the Indian context. These factors are: Top management commitment, Suppliers quality management, Human resources management, Process management, Customer focus, Role of quality department, Product design, Quality information system, training and Quality citizenship. The findings shows that Process management, top management leadership and customer focus are the top three factors for implementation of TQM in the manufacturing industry in India.

**Islam and Haque (2017)** provided the implementation issues of TQM in manufacturing organizations. A framework for TQM implementation was developed that engaged essential pillars, and their associated factors. The developed framework was verified in the practical settings in Ready Made Garments (RMG) Industry in Bangladesh. In this empirical investigation, 31 export-oriented organizations in the Ready Made Garments (RMG) industry were studied. The findings shows that the creation of quality management environment, team work, quality control tools and techniques, supplier relationship and customer focus are the main pillar of TQM implementation.

**Dubey, et al. (2018)** examined the mediating effect of human resource (HR) between independent variables (i.e. leadership and quality culture (QC)) and successful total quality management (TQM) implementation for firm performance as dependent variable. The output suggests that HR is a complete mediation between independent variables (i.e. leadership) and successful TQM

implementation for firm performance and QC is having direct impact on firm performance without any mediation effect of HR.

**Majumdar, J.P (2018)** investigated the critical factor for successful implementation of TQM and the causes responsible for reluctance of the SME in adopting TQM has been studied. By overcoming their weaknesses and effective utilization of their inherent strengths there is wide possibility of adopting TQM by Indian manufacturing SMEs effectively.

**Vedant Singh et al. (2018)** studied the implementation of Total Quality Management (TQM) in Indian industries and to study its influence on the organizational performance. The hypotheses and conceptual framework were designed in accordance with Indian context. The completely useful 236 samples were collected from eight small and medium-sized Indian (SME) manufacturing and service companies. The data was classified into two categories i.e. Managers and Workers. The data collected then analyzed using SPSS-AMOS 24. All the hypotheses were positively fit with the conceptual model and hence showed the positive impact of TQM on organizational performance (OP).

**Garg, et al. (2019)** investigated the issue of excellence of quality strategy in a Deming Application Prize winner company. The finding showed that whatever quality philosophy we follow, be it TQM, six sigma, ISO 9000, or something else, we must have a continuous zeal and serious intentions of improving the quality of our products and services. Tata Steel has inculcated the philosophy of Total Quality Management and Business Excellence as part of the company's Corporate Business Strategy. Any company can gain competitive advantage and move towards business excellence.

### III. PROBLEM FORMULATION

“Performance of Total Quality Management in Manufacturing Industry to Increase Production Rate”. which is a case study is taken up with a purpose of productivity improvement on Rack and Pinion Steering (RPS) assembly line in YAD model by Reducing Rejection through TQM Problem Solving Approach.

### IV. OBJECTIVES OF CURRENT RESEARCH

- To study the impact of TQM practices in manufacturing industry
- Identify and evaluate the key factors required to facilitate TQM implementation in the industry.
- Determine the benefits of applying TQM with in the manufacturing industry.

### V. ANALYZE CAUSES

To understand the causes of higher rejection, the following two techniques were used by the project team.

- Pareto Diagram
- Cause and effect diagram (Fishbone diagram).

### VI. STANDARDIZE RESULTS

After standardization of processing conditions, work standard quality control (WSQC) and check sheets were updated on the RPS assembly line of YAD model to increase the productivity. Modifications made in the assembly line are as shown in the Table 6.1.

Table 1 Standardize Results.

S. no	Action	Responsibility	Target date	Status
1	Torque wrench setting to be changed 380 kg-cm to 450 kg-cm	QA	21/11/2019	Closed
2	WSQC to be updated	ME	05/12/2019	Closed
3	Calibration check sheet to be revised	QA	08/12/2019	Closed

### VII. CHECK RESULTS

Before TQM implementation RPS assembly line average production rate was 77% but after implementation of project findings the production rate increased up to 99 % within a period of one month.

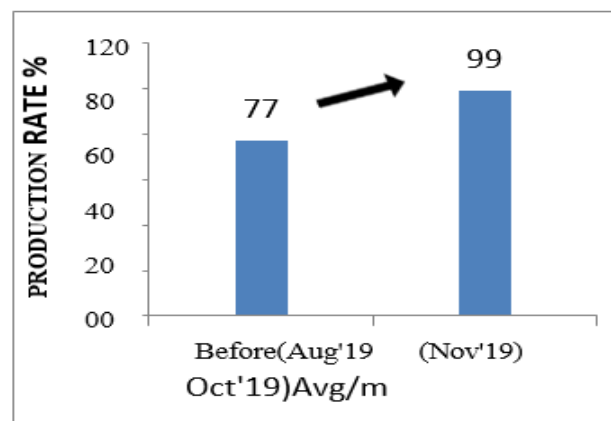


Figure 1 Before and After RPS assembly line Production rate status.

## VIII. CONCLUSION

It was concluded that after implementing TQM, productivity improvement of RPS assembly line of YAD model has been achieved by increasing the production rate from 77% to 99%. It is concluded that by implementation of TQM, the productivity of company increased, rejection quantity level of products reduces, customer's satisfaction are achieved and profits for the company increases, hence performance of the company is improved.

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