



# A Study on Total Quality Management

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## ABSTRACT

Quality control is a procedure or set of procedures intended to ensure that a manufactured product or performed service adheres to a defined set of quality criteria or meets the requirements of the client or customer". Many companies believe that cost of introduction of TQM is for greater than the benefits it will produce. However, research across a number of industries has cost involved doing nothing it is the direct and indirect costs of quality problem are for greater than the cost of implementing TQM. A present study is an attempt to understand and ascertain the implementation of Total Quality Management in Micon Engineers (Hubli) Pvt. Ltd.

## Introduction

The industrial steel valves are in India actuator market is experiencing rapid growth due to the development of chemicals and petrochemical industries. Power generation plants are to be restricted to increase efficiency in energy saving and environment protection. Future investments in nuclear power generation are likely to generate substantial revenues for the total industrial valves and actuators market, creating numerous growth opportunities for market participants.

Several major national projects are being launched providing many avenues for industry participants to increase market share. Oil and Gas pipeline related projects create vast demands for valves and actuators. Reinforcing sewage treatment is conducive to revenue growth. Transfer of foreign valves technology and the application of other relative technologies are likely to boost demand for this product in the market.

With over 3000 participants, the industrial valves and actuators market is a highly competitive one. The low-end market is flooded with small domestic companies serving niche segments by producing labor-intensive valves with low technical content. These participants usually gain competitive advantage by lowering prices. On the other hand, multinational companies providing specialty valves and sophisticated

actuators compete in the high-end market generating the majority of market revenues. To sustain or increase their market position, industry participants, especially multinationals, are likely to carry out acquisitions and mergers, notes the analyst of this research service. Market participants can also garner larger revenues by periodically upgrading their products.

There is a growing need for robust valves offering stable performance and higher degree of automation to cope with the increasing automation of industries. This is increasing investment in the research and development of valves. One of the major advances has been the application on the intelligent valves integrated with embedded system, field bus, and computer-based controls. Intelligent valves that are capable of self-diagnosis, data processing, and networking with computer based control systems can optimize valves system management, observes the analyst. Further technical improvement towards more reliability and extending functionalities are likely to occur as technical valves gain wider acceptance.

However in the near term more buyers may opt to purchase the less expensive standard valves as non residential fixed investment slows, possibly upgrading them with separately sold actuator at a later date. Steel and steel alloys are expected to remain the most commonly utilized valves construction materials due to their durability and strong performance in high temperature, high stress application. Although valves performance will continue to be improved by advances in non-traditional materials (e.g., plastics, titanium and other metal alloys), steel and steel alloys will still make up nearly one-half of valves demanded by 2021.

#### **Need for the study**

- To understand the quality plans and inspection plans process in the Micon Engineers.
- To know the practical applicability and reliability of total quality management.
- To understand the company's current manufacturing discipline and how well it suits with the total quality management because Total quality management decreases the percentage of rejection, wastage and reduces defective work.
- To help in improving appropriate waste management techniques so that the company can achieve six sigma level easily.

## Review of Literature

Total quality management (TQM) is one of the quality-oriented approaches that many organizations imply. TQM has attracted scholars because of the growing diffusion and acceptance in the business world. Especially over the two decades, TQM is one of the most popular and durable management concepts. Due to the absence of a uniform definition of TQM, defining TQM is quite problematic. Well accepted definitions of TQM in the literature based on “quality gurus” (Juran [1], Crosby [2], Feigenbaum [3]) views and prescriptions. For example, according to Rahman TQM is a management approach for improving organizational performance that encompasses a variety of both technical and behavioral topics. Another definition of TQM is that of Kaynak [4], “TQM is a holistic management philosophy that strives for continuous improvement in all functions of an organization, and it can be achieved”. TQM is a multidimensional construct. Like having various definitions, TQM consists of several activities. Different researchers have adopted different TQM activities for testing its effect on financial or non-financial performance. These activities are management leadership, role of the quality department, training, employee relations, quality data and reporting, supplier quality management, product service design, process management, strategic planning, customer focus, information technology and analysis, people management.

The links between TQM and performance have been investigated by numerous scholars. While examining the relationship between TQM and performance scholars have used different performance types such as financial, innovative, operational and quality performance. Although the effects of TQM on various performance types are inconsistent, quality performance generally indicated strong and positive relations. Supporters of TQM suggest that implement it well generate higher quality products. According to Deming, quality is the principal determinant of success in competitive environments. Quality management is increasingly high-profile activities for all kinds of firms and is associated with gaining a competitive advantage.

After seeking the literature, Kaynak revealed the indicators of quality performance which is relevant to TQM. TQM practices help to promote quality performance. The indicators for quality performance are product/service quality, productivity, cost of scrap and rework, delivery lead-time of purchased materials, and delivery lead-time of finished products to customers. The aim of TQM activities such as employee involvement is to promote the human aspects of the quality system in order to adapt changing environment. Customer focus and process management represents the major components of quality. The quality is important for customers. Wilkinson [5] suggest that; “in terms of TQM, the conception of quality should meet customer requirements”. One of the main elements of TQM is the process management. Process management improves the quality of the product in the production stage. Hence, it is felt necessary to go into the details of TQM of Micon Engineers.

## Objectives of the study

- To understand the concept of TQM.
- To understand the application of Total Quality Management in Micon Engineers (Hubli) Pvt. Ltd particularly with respect to Percentage of rejection and wastage.
- To know the results on application of Total Quality Management.

## Research methodology

A present study is an attempt to understand and ascertain the implementation of Total Quality Management in Micon Engineers (Hubli) Pvt. Ltd. The Study has been conducted based on the primary and secondary data collected.

Different elements used as a measure for understanding and improving quality system in Micon Industries (Hubli) Pvt. Ltd.

- Quality control circles and suggestion system.
- Quality control.
- Control of production.
- Quality planning, implementation, improvement.
- Customer relationship management.

## ANALYSIS AND INTERPRETATION

### 1. Table showing calculation of percentage on wastage and rejection for the year 2015-2016.

Months	Waste / Total Production*100	Percentage of wastage	Rejection/Total Sales*100	Percentage of Rejection
April	5/140*100	3.5714	10640/940800*100	1.1310
May	3/143*100	2.0979	7947/960960*100	0.8270
June	4/135*100	2.9630	8440/907200*100	0.9303
July	2/140*100	1.4286	11570/940800*100	1.2298
August	3/145*100	2.0690	0/974400*100	0.0000
September	1/144*100	0.6944	7897/967680*100	0.8161
October	4/140*100	2.8571	6900/940800*100	0.7334
November	1/138*100	0.7246	8543/927360*100	0.9212
December	5/138*100	3.6232	6500/927360*100	0.7009
January	0/147*100	0.0000	8125/987840*100	0.8225
February	2/139*100	1.4388	6891/934080*100	0.7377
March	1/140*100	0.7143	8497/940800*100	0.9032
	Total	22.1824	Total	9.7531

**Note:** Calculation of Percentage of rejection and wastage:

$$\text{Percentage of wastage} = \text{Waste} / \text{total production} * 100$$

**Interpretation:**

$$\text{Percentage of Rejection} = \text{Rejection} / \text{total sales} * 100$$

Table 1 shows that the percentage of wastage conducted in the company for different months for the year 2015-2016. There is lot of fluctuations in the wastage of the company. In the month of December there was a maximum wastage of 3.6232% is done and in the month of January there was a lowest wastage of 0% and for all the other months the percentage of wastage is in between 0 and 3.6232%. But most of the time company has decreased its wastage in the year 2015-2016.

The percentage of the rejection conducted in the company of the different months. There is also lot of fluctuations in the rejection level of the company for the year 2015-2016. The company has reached lowest rejection level in the month of august that is 0 and maximum rejection is done at 1.2298% in the month of July.

## 2. Table showing calculation of percentage on wastage and Rejection for the year 2016-2017.

Months	Waste / Total Production*100	Percentage of wastage	Rejection/Total Sales*100	Percentage of Rejection
April	4/128*100	3.125	10000/786432*100	1.2716
May	3/128*100	2.3438	10500/786432*100	1.3351
June	0/130*100	0	9758/798720*100	1.2217
July	3/128*100	2.3438	8765/786432*100	1.1145
August	5/126*100	3.9683	5924/890880*100	0.6650
September	4/127*100	3.1496	7123/780288*100	0.9129
October	3/126*100	2.3810	7770/774144*100	1.0037
November	0/126*100	0.0000	6000/774144*100	0.7750
December	1/125*100	0.8000	7642/768000*100	0.9951
January	3/120*100	2.5000	0/737280*100	0.0000
February	2/130*100	1.5385	5000/798720*100	0.6260
March	1/128*100	0.7813	9010/786432*100	1.1457
	Total	22.9310	Total	11.0662

Table 2 shows that the percentage of wastage conducted in the company for different months for the year 2016-2017. There is lot of fluctuations in the wastage of the company. In the month of August there was a maximum wastage of 3.9683% is done and in the month of June and November there was a lowest wastage of 0%. And for all the other months the percentage of wastage is in between 0 and 3.9683%. But most of the time company has decreased its wastage in the year 2016-2017.

The percentage of the rejection conducted in the company of the different months. There is also lot of fluctuations in the rejection level of the company for the year 2016-2017. The company has reached lowest rejection level in the month of January that is 0 and maximum rejection is done at 1.3351 in the month of May.

### 3. Table showing calculation of percentage on wastage and Rejection for the year 2017-2018.

Months	Waste / Total Production*100	Percentage of wastage	Rejection/Total Sales*100	Percentage of Rejection
April	2/160*100	1.25	8543/1228800*100	0.6952
May	3/155*100	0.9355	7400/1190400*100	0.6216
June	1/160*100	0.625	0/1228800*100	0
July	5/157*100	3.1847	6274/1205760*100	0.5203
August	2/164*100	1.2195	9800/1259520*100	0.7781
September	4/160*100	2.5000	7100/1228800*100	0.5778
October	0/158*100	0.0000	7800/1213440*100	0.6428
November	1/163*100	0.6135	5928/1251840*100	0.4735
December	1/156*100	0.6410	6500/1198080*100	0.5425
January	4/160*100	2.5000	8740/1228800*100	0.7113
February	0/165*100	0.0000	7000/1267200*100	0.5524
March	3/160*100	1.8750	8975/122880*100	0.7304
	Total	16.3442	Total	6.8460

Table 3 shows that the percentage of wastage conducted in the company for different months for the year 2017-2018. There is lot of fluctuations in the wastage of the company. In the month of July there was a maximum wastage of 3.1847 is done and in the month of February and October there was a lowest wastage of 0. And for all the other months the percentage of wastage is in between 0 and 3.1847. But most of the time company has decreased its wastage in the year 2017-2018.

The percentage of the rejection conducted in the company of the different months. There is also lot of fluctuations in the rejection level of the company for the year 2017-2018. The company has reached lowest rejection level in the month of June that is 0 and maximum rejection is done at 0.7781 in the month of August.

### 4. Table showing calculation of percentage on wastage and Rejection for the year 2018-2019.

Months	Waste / Total Production*100	Percentage of wastage	Rejection/Total Sales*100	Percentage of Rejection
April	4/200*100	2	7000/1920000*100	0.3646
May	0/190*100	0	4500/1824000*100	0.2467
June	3/200*100	1.5	9764/1920000*100	0.5085
July	1/207*100	0.4831	0/1987200*100	0.0000
August	1/189*100	0.5291	8890/1814400*100	0.4900
September	3/200*100	1.5000	7000/1920000*100	0.3646
October	0/196*100	0.0000	6440/1881600*100	0.3423
November	1/200*100	0.5000	8470/1920000*100	0.4411
December	2/198*100	1.0101	9900/1900800*100	0.5208
January	3/195*100	1.5385	6975/1872000*100	0.3726
February	0/205*100	0.0000	6800/1968000*100	0.3455
March	2/200*100	1.0000	5975/1920000*100	0.3112
	Total	10.0608	Total	4.3080



Table 4 shows that the percentage of wastage conducted in the company for different months for the year 2018-2019. There is lot of fluctuations in the wastage of the company. In the month of April there was a maximum wastage of 2% is done and in the month of May, October and February there was a lowest wastage of 0. And for all the other months the percentage of wastage is in between 0 and 2%. But most of the time company has decreased its wastage in the year 2018-2019.

The percentage of the rejection conducted in the company of the different months. There is also lot of fluctuations in the rejection level of the company for the year 2018-2019. The company has reached lowest rejection level in the month of July that is 0 and maximum rejection is done at 0.5208 in the month of December.

### 5. Table showing calculation of percentage on wastage and Rejection for the year 2019-2020.

Months	Waste / Total Production*100	Percentage of wastage	Rejection/Total Sales*100	Percentage of Rejection
April	2/250*100	0.8	8478/3000000*100	0.2826
May	3/253*100	1.1858	7523/3036000*100	0.2478
June	0/255*100	0	10575/3060000*100	0.3456
July	4/245*100	1.6327	5234/2940000*100	0.1780
August	1/247*100	0.4049	6000/2964000*100	0.2024
September	2/250*100	0.8	6957/3000000*100	0.2319
October	0/256*100	0	5475/3072000*100	0.1782
November	2/244*100	0.8197	6729/2928000*100	0.2298
December	1/243*100	0.4115	6200/2916000*100	0.2126
January	0/251*100	0	0/3012000*100	0
February	2/250*100	0.8	8940/3000000*100	0.298
March	0/250*100	0	4843/3000000*100	0.1614
	Total	6.8544	Total	2.5684

The Table 5 shows that the percentage of wastage conducted in the company for different months for the year 2019-2020. There is lot of fluctuations in the wastage of the company. In the month of July there was a maximum wastage of 1.6327 is done and in the month of June, October, January and March there was a lowest wastage of 0. And for all the other months the percentage of wastage is in between 0 and 1.6327. But most of the time company has decreased its wastage in the year 2019-2020.

The percentage of the rejection conducted in the company of the different months. There is also lot of fluctuations in the rejection level of the company for the year 2019-2020. The company has reached lowest rejection level in the month of January that is 0 and maximum rejection is done at 0.3456 in the month of June.

## 6. Table showing Total Wastage and Total Rejection for 5 years

Years	Percentage of wastage	Percentage of Rejection
2015-2016	22.1824	9.7531
2016-2017	22.9310	11.0662
2017-2018	16.3442	6.8460
2018-2019	10.0608	4.3080
2019-2020	6.8544	2.5684

Table 6 shows that the Total Wastage for the year 2015-2016 was 22.1824, for the year 2016-2017 it was 22.9310, for the year 2017-2018 it was 16.3442, for the year 2018-2019 it was 10.0608, and for the last year 2019-2020 it was 6.8544.

Total Rejection for the year 2015-2016 it was 9.7531, for the year 2016-2017 it was 11.0662, for the year 2017-2018 it was 6.8460, for the year 2018-2019 it was 4.3080, and for the last year 2019-2020 it was 2.5684.

In this way the percentage of Total wastage and percentage of Total Rejection is increasing for first 2 years. But in 2015-2016, 2016-2017 & 2017-2018 it decreased. There is a fluctuation month by month in all five years.

### Findings:

- 1) In some cases, products are being rejected by customers, because, valves are not manufactured as per client's technical specification.
- 2) 100% ordered quantity could not be delivered to client because of rejection of castings (moulded products) during processing.
- 3) Valves dispatched to clients were damaged due to improper packing and paint peel off.
- 4) Procured raw materials were deteriorated due to improper storage.
- 5) Proper training is not given to workers, this leads to increase in wastage & rework, and additional cost is incurred correction and managing scrap.
- 6) In case of change in design of the products then the already existing valves of old design cannot be either re-used or recycled so this is wastage to the company and it also incurs inventory cost.

As per the study it is observed that there is a decrease in the percentage of Wastage and Rejection every year, which indicates there is an improvement in quality management of the company.



## Suggestions:

- 1) The company should manufacture the products according to the specification of the customers.
- 2) The Quality control department should take proper care at inspection stage.
- 3) Logistics department should take proper care while painting, packing exactly as per client's specification data sheet. And materials should be packed in Roadworthy/Sea-worthy/Air-worthy to avoid transit damages.
- 4) The Stores Department should take utmost care while preservation of products.
- 5) Training should be given to the employees who are lagging behind in understanding the system in their respective departments, so that rejection and wastage can be avoided.
- 6) The company should maintain minimum inventory levels rather than maintaining maximum inventory.
- 7) The company should implement in house testing facility of product in place of outside testing which will help in reducing the cost.
- 8) Reasons for rejection and wastage at particular seasons must be founded and some new testing's or inspection must be adopted to avoid further problems.
- 9) The company should undertake periodic supervision of the quality control measures implemented to avoid any deviation that may lead to any increase in wastage or cost.
- 10) Evaluating of supplier is the most important aspect. So, supplier evaluation should be carried out by concerned department personnel as per Quality Management System so that right materials can be supplied.

## Conclusion

By the Introduction of Total Quality Management method in MICON Engineers (Hubli) Pvt. Ltd., gives the clear picture that the company has continuously improved on production of goods and services. It has also observed through this method, the company could reduce their percentage of wastage and rejection and focus on the Quality Management of the products. From the study, it could find that, the way company manages the Quality of their production of goods and services is observed satisfactory.

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