

TOTAL QUALITY MANAGEMENT (TQM) AT AN ORIGINAL DEVICE
MANUFACTURER (ODM) A CASE STUDY: FAILURE ANALYSIS
DEPARTMENT

GEEVA RAJ A/L RAMANATHAN

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ABSTRACT

The purpose of this write up is to execute and evaluate a case study implementation of Total Quality Management (TQM) philosophy at the Failure Analysis Department of an Original Device Manufacture (ODM). This is an implementation effort at a very technically inclined entity whereby the pre-implementation and post-implementation evaluation highlights the main TQM elements that mainly influences the entity. Quantitative and non-quantitative assessments are used to assess the pre-implementation and post-implementation changes. Eventually, the implementation efforts are conceptualized. Based on the implementation, it was identified that Continuous Improvement, Employee Involvement, and Training and Education are the main TQM elements that influence the Failure Analysis Department in particular and the ODM in general.

ABSTRAK

Penulisan ini adalah dengan objektive untuk melaksanakan and menilai sebuah kes penkajian mengenai pelaksanaan falsafah Pengurusan Kualiti Menyeluruh (Total Quality Management – “TQM”) di Jabatan Analisa Kegagalan, Sebuah Pembuat Peranti Asli. Ini adalah satu usaha perlaksanaan di sebuah entiti yang berasaskan kegiatan teknikal. Penilaian sebelum and selepas perlaksanaan digunakan untuk mengenal pasti faktor TQM yang memainkan peranan penting dalam entiti tersebut. Penilaian kuantitatif and tidak kuantitatif digunakan untuk menilai perbezaan antara sebelum dan selepas perlaksanaan. Hasil pelaksanaan ini akan dirumuskan; dan dicatakan proses perlaksanaan yang telah diambil. Berasaskan kes perlaksanaan ini “Pembaikan Berfarsa”, “Penglribitan para pekerja”, dan “Latihan dan pendidikan” dikenal pasti sebagai faktor TQM yang mempengaruhi Jabatan Analisa di Sebuah Pembuat Peranti Asli.

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1.3 Objectives

With the top management of the ODM plant having geared into the quality drive. An effort is being made across all departments to improve the quality management principles of the departments. With the picture of impact that the Failure Analysis Department has on the ODM's organization and the current state of the department defines earlier, drives this department as well to make it move in evolving its quality principles. The project objective is set at defining holistic quality management principles that best suit the department and organization with the foundation of the principles set at the basis of Total Quality Management ideology. This will be followed with the implementation of the principles at the department.

A successful implementation is foreseen with the hope that the climax of the Total Quality Management ideology implementation will improve the perception of the department within the customers, internal and external and the reflection of the success being translated to a higher yield of the products. This will enable the corporation to best serve the needs of the customers. After all customer satisfaction is the focus of Total Quality Management.

1.4 Scope and Key Assumptions

The quality drive journey is a top management driven and a plant level drive. In order to revamp the quality practices of the plant as in overall, I will go to the extent of saying "waking up" the paper level quality to a quality principle that encompasses the day to day practice. As the case study focus will be set at the Failure Analysis Department to look at preconditions of the department's quality practices and to gauge the success level or changes seen in that department via the adoption of TQM as quality guiding principle.

There are six principles that could define the overall area of the Total Quality Management (Quek and Sha'ri, 2003 and Martins and de Toledo, 2000) and they are given in the following:

- Management Leadership and Commitment
- Continuous Improvement
 - Upstream control
 - Process management
- Total Customer Satisfaction
 - Quality first
 - Market-in – customer orientation
 - Next process downstream is a customer (internal customer)
- Employee Involvement
 - Management by facts
 - Employee respect
- Training and Education
 - Poke yoke
- Reward and Recognition
 - Motivation by recognition

TQM principles do not work individually; it is a collective value that complements each other. Hence for the purpose of implementation all of the stated principles have to be adopted. Since they are all an interlinked element to the concept of TQM. After all TQM focuses on the process not the individual (Tavana et. al., 2003).

For the purpose of the project and project write-up implementation emphasis will be focused on just the three element:

- Continuous Improvement
 - Upstream control
 - Process management

- Employee Involvement
 - Management by facts
 - Employee respect

- Training and Education
 - Poke yoke
 - Motivation by recognition

This emphasis is based on the personal first hand experience at managing the department and verbal dialog session input obtained from the employee of the department and also from the internal and external customer. Coupled with the customer and employee feedback; the department's function; the important element needed by the department to do a flawless execution of the function and the current state of the department of the elements calls for the focus to be set at the three elements.

A questionnaire was carried out to support this point of focus for the project and write-up. A quality system survey questionnaire developed by Saraph et. al. (1989) will be used. The questionnaire is meant for evaluating quality management in either manufacturing or service organizations (Tavana et. al., 2003). Further more since it has been a time tested questionnaire to gage the standards of quality management (Kumar et al., 1999). Adaptation of this questionnaire eliminates the need to develop a new questionnaire which is time consuming and the need to vet the questionnaire.

1.5 Importance of the Project

The need for a quality system is no more for a formality process. Having a system like ISO19000 but not fully embracing it is a failure of implementation and it will lead to the failure of quality system. Quality system has become a tool of competitiveness in this globalized business arena. Quality is the focal point of corporation's survival. Hence with this emphasis in mind, the plant top management has embarked on Quality improvement drive. This is one of the trigger points that drove the departments of the corporation to set it focus on improving it quality management. On that note the Failure Analysis Department which has a significant quality performance indicator impact to the corporation has started it journey in quality management improvement.

It is notable that the current low state of the internal and external customers' perception of the department is the main driving factor of this quality drive and this project implementation. The success of quality management improvement at this department will be reflected in the overall yield improvement of the ODM's products. Apart from that it will also reflect the confidence level of customer internal and external. This is the important part of TQM, focus on the customer, leading to customer satisfaction.

Even though the department and the company in general are an ISO19000 registered via parent company, currently the department do not fully embrace the basis of quality operation fundamentals. The ISO9000 system is practiced purely as a documentation standard, rather than a system as overall. This it is one of the main justification that the department need to implement/put-to-practice a principle that could set the mindset of the department operation. With the department being a technical analytical team that defines Fault Model Effect Analysis (FMEA) on a regular basis it is critical for the department to adopt a system which could provide a structured solution.

With the quality drive that has been put into gear at top management level sets the right environment for TQM implementation. This sets the platform for having the continuous commitment of the top management. This is a piece of TQM jigsaw puzzle that is of very important value for the successful implementation of TQM ideology, since it involves the change of culture at all level. It is noted that perfect timing is a variable in the successful implementation of TQM (Hashmi); The timeliness of TQM implementation is important so that all the jigsaw puzzle in TQM implementation could fall in place. A successful implementation of TQM involves internal and external factor, with one of the factor being the wheels of motion (Hashmi).

As of system implementation, all the elements of TQM will be rolled out, but special emphasis will be given to three elements in this case study implementation and project writing at the Failure Analysis department as defined earlier.

This is so because of the nature of the department where the function of the department is very much experience and technical knowledge based. Apart from that verbal survey from the employees of the department and the internal and external customer has pointed to the prioritization of the three elements over the other elements for the department. A questionnaire survey is being carried out to support this direction of focus.

1.6 Organisation of the Report

With the introduction of the report that provide an insight to the background of the problem and defining the problem statement, this report will be furnished with a literature review that looks into the concept of Total Quality Management (TQM) and the implementation principles of TQM.

A description of the methodology will follow thereafter describing how the pre and post implementation evaluation will be done address two main factors of implementation: the product yield factor (quantitative) and the customer satisfaction factor (in-quantitative).

This data points will be discussed based on the five element of TQM that is to be implemented. With that highlights and lowlights of the implemented will be identified and concluded upon. Possible future study/research will be noted at the end.

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Appendix A

QUESTIONARE SURVEY FORM

The purpose of this questionnaire is to assess your perceptions of the extent of effective quality management in the department. The questionnaire captures the most important aspects of effective quality management as espoused by the leading practitioners and researchers. This is a confidential survey. Your name is not required to complete it.

Please read each statement carefully and circle the number that best describes the current practice of quality management within the department. (For the department managers, this statement reworded to focus on the ideal state: . . .that best describes the ideal level of quality management in the department.) Answer each statement as accurately as possible and remember that you are assessing your own perceptions of how quality management is practiced in the company. (For the department managers: should be practiced in the department.)

Rating of current practice in the
Department (rating of the ideal level of QM
in the department)

Very low Low Medium High Very
high

Role of divisional top management and quality policy

- | | | | | | |
|--|---|---|---|---|---|
| • Extent to which the top division executive (responsible for division profit and loss) assumes responsibility for quality performance | 1 | 2 | 3 | 4 | 5 |
| • Acceptance of responsibility for quality by major department heads within the division | 1 | 2 | 3 | 4 | 5 |
| • Degree to which divisional top management (top divisional executive and major department heads) is evaluated for quality performance | 1 | 2 | 3 | 4 | 5 |
| • Extent to which the division top management supports long-term quality improvement process | 1 | 2 | 3 | 4 | 5 |
| • Degree of participation by major department heads in the quality improvement process | 1 | 2 | 3 | 4 | 5 |
| • Extent to which the divisional top management has objectives for quality performance | 1 | 2 | 3 | 4 | 5 |
| • Specificity of quality goals within the division | 1 | 2 | 3 | 4 | 5 |
| • Comprehensiveness of the goal-setting process for quality within the division | 1 | 2 | 3 | 4 | 5 |
| • Extent to which quality goals and policy are understood within the division | 1 | 2 | 3 | 4 | 5 |
| • Importance attached to quality by the divisional top management in relation to cost and schedule objectives | 1 | 2 | 3 | 4 | 5 |
| • Amount of review of quality issues in divisional top management meetings | 1 | 2 | 3 | 4 | 5 |
| • Degree to which the divisional top management considers quality improvement as a way to increase profits | 1 | 2 | 3 | 4 | 5 |
| • Degree of comprehensiveness of the quality plan within the division | 1 | 2 | 3 | 4 | 5 |
-

Rating of current practice in the department (rating of the ideal level of QM in the department)

Very low Low Medium High Very high

Role of the quality department

• Visibility of the quality department	1	2	3	4	5
• Quality department's access to divisional top management	1	2	3	4	5
• Autonomy of the quality department	1	2	3	4	5
• Amount of coordination between the quality and other departments	1	2	3	4	5
• Effectiveness of the quality department in improving quality	1	2	3	4	5

Training

• Specific work-skills training (technical and vocational) given to hourly employees throughout the division	1	2	3	4	5
• Quality-related training given to hourly employees throughout the division	1	2	3	4	5
• Quality-related training given to managers and supervisors throughout the division	1	2	3	4	5
• Training in the "total quality concept" (i.e. philosophy of company-wide responsibility for quality) throughout the division	1	2	3	4	5
• Training in the basic statistical techniques (such as histograms and control charts) in the division as a whole	1	2	3	4	5
• Training in advanced statistical techniques (such as design of experiments and regression analysis) in the division as a whole	1	2	3	4	5
• Commitment of the divisional top management to employee training	1	2	3	4	5
• Availability of resources for employee training in the division	1	2	3	4	5

Product/service design

• Thoroughness of new product/service design reviews before the product/service is produced and marketed	1	2	3	4	5
• Coordination among affected departments in the product/service development process	1	2	3	4	5
• Quality of new products/services emphasized in relation to cost or schedule objectives	1	2	3	4	5
• Clarity of product/service specifications and procedures	1	2	3	4	5
• Extent to which implementation/producibility is considered in the product/service design process	1	2	3	4	5
• Quality emphasis by sales, customer service, marketing, and PR personnel	1	2	3	4	5

Rating of current practice in the department (rating of the ideal level of QM in the department)

Very low
high Low Medium High Very high

Supplier quality management (supplier of goods and/or services)

• Extent to which suppliers are selected based on quality rather than price or schedule	1	2	3	4	5
• Thoroughness of the supplier rating system	1	2	3	4	5
• Reliance on reasonably few dependable suppliers	1	2	3	4	5
• Amount of education of supplier by division	1	2	3	4	5
• Technical assistance provided to the suppliers	1	2	3	4	5
• Involvement of the supplier in the product development process	1	2	3	4	5
• Extent to which longer term relationships are offered to suppliers	1	2	3	4	5
• Clarity of specifications provided to suppliers	1	2	3	4	5

Process management/operating procedures

• Use of acceptance sampling to accept/reject lots or batches of work	1	2	3	4	5
• Amount of preventative equipment maintenance	1	2	3	4	5
• Extent to which inspection, review, or checking of work is automated	1	2	3	4	5
• Amount of incoming inspection, review, or checking	1	2	3	4	5
• Amount of in-process inspection, review, or checking	1	2	3	4	5
• Amount of final inspection, review, or checking	1	2	3	4	5
• Stability of production schedule/work distribution	1	2	3	4	5
• Degree of automation of the process	1	2	3	4	5
• Extent to which process design is "fool-proof" and minimizes the chances of employee errors	1	2	3	4	5
• Clarity of work or process instructions given to employees	1	2	3	4	5

Quality data and reporting

• Availability of cost of quality data in the division	1	2	3	4	5
• Availability of quality data (error rates, defect rates, scrap, defects, etc.)	1	2	3	4	5
• Timeliness of the quality data	1	2	3	4	5
• Extent to which quality data (cost of quality, defects, errors, scrap, etc.)	1	2	3	4	5
• Extent to which quality data are available to hourly employees	1	2	3	4	5
• Extent to which quality data are available to managers and supervisors	1	2	3	4	5
• Extent to which quality data are used to evaluate supervisor and managerial performance	1	2	3	4	5
• Extent to which quality data, control charts, etc., are displayed at employee work stations	1	2	3	4	5

Rating of current practice in the department (rating of the ideal level of QM in the department)

Very low high
Low Medium High Very

Employee relations

• Extent to which quality circle or employee involvement type programs are implemented in the division	1	2	3	4	5
• Effectiveness of quality circle or employee involvement type programs in the division	1	2	3	4	5
• Extent to which employees are held responsible for error-free output	1	2	3	4	5
• Amount of feedback provided to employees on their quality performance	1	2	3	4	5
• Degree of participation in quality decisions by hourly/non-supervisory employees	1	2	3	4	5
• Extent to which quality awareness building among employees is ongoing	1	2	3	4	5
• Extent to which employees are recognized for superior quality performance	1	2	3	4	5
• Effectiveness of supervisors in solving problems/issues	1	2	3	4	5

END

Adaptation of Questionnaire from:
Saraph, J.V., Benson, P.G. and Schroeder, R.G. (1989), "An instrument for measuring the critical factors of quality management", *Decision Sciences*, Vol. 20 No. 4, pp. 810-29.