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To Identify the Barriers for the Implementation of Total Quality Management in Aircraft Maintenance

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Abstract - Total quality management (TQM) is the method of discovering and minimising or eradicating production defects, optimising supply chain management, improving customer experience, and ensuring that staff are properly trained. Total quality management seeks to hold all parties engaged in the manufacturing process responsible for the final product's or service's overall quality. This paper aims for identifying the barriers for an analytical study and for the implementation of total quality management in aircraft maintenance by identifying the enablers and barriers of total quality management and developing an interpretive structural model for Total Quality Management model. The enablers & barriers of Total Quality Management in aircraft maintenance have been identified in this paper.

Keywords – Total Quality Management, Quality, Maintenance, Aviation, Aircraft, Aero-engine, Manufacturing, Repair and Overhaul

1. Introduction

Aircraft maintenance is a highly regulated sector that requires licensed Maintenance, Repair, and Overhaul (MRO) technicians to perform a rigorous regimen of planned or preventative servicing, inspection, testing, repair, overhaul, or modification activities on every aircraft in service. Overhaul, inspection, replacement, fault rectification, and the incorporation of modifications, as well as compliance with airworthiness directives and repair, are all actions required to maintain an aircraft or aircraft part's continued airworthiness.

Total quality management (TQM) entails efforts at all levels of an organization to "create and maintain a climate in which employees are continually improving their capacity to produce on-demand products and services that consumers will find particularly valuable. "Total" underlines that departments other than production (such as sales and marketing, accounting and finance, engineering and design) must enhance their operations; "management" emphasizes that executives must actively manage quality through funding, training, staffing, and goal setting. While there is no universally accepted approach, TQM operations often rely largely on quality control tools and techniques that have already been created. During the late 1980s and early 1990s, TQM drew a lot of attention before being eclipsed by ISO 9000, Lean manufacturing, and Six Sigma.

The industrialized countries of North America and Western Europe suffered economically in the late 1970s and early 1980s as a result of Japan's capacity to create high-quality items at low prices. The United Kingdom became a net importer of completed goods for the first time since the Industrial Revolution began. The United States did its own soul-searching, which was most eloquently expressed on television in the documentary If Japan Can... Why Can't We? Firms began reexamining the quality control procedures developed over the previous 50 years, as well as how the Japanese had used them so successfully. TQM arose in the midst of this economic downturn.

The term "total quality management" has an ambiguous history. Total Quality Control (OCLC 299383303) by Armand V. Feigenbaum and Kaoru Ishikawa's What Is Total Quality Control? Japan's Approach (OCLC 11467749). It's possible that the Department of Trade and Industry coined the term in 1983 during its "National Quality Campaign" in the United Kingdom. It's also possible that the Naval Air Systems Command created the term in 1985 to characterize its quality-improvement efforts in the United States.

Features

Although there is no universal agreement on what TQM is and what activities it requires of businesses, an examination of the initial US Navy effort provides a rough idea of what TQM entails.

The following are some of the important themes in the Navy's TQM program in the 1980s:

• "Quality is determined by the needs of the customer."

• "Quality improvement is a direct duty of top management."

• "Systematic analysis and enhancement of work processes leads to increased quality."

• "Quality improvement is a never-ending process that takes place throughout the company."

The Navy employed the following methods and tools:

• Using the PDCA cycle (Plan-Do-Check-Act) to resolve difficulties

• Ad hoc cross-functional teams (akin to quality circles) tasked with resolving urgent process concerns

• Permanent cross-functional teams tasked with long-term process improvement

• Steering committees allow active management participation.

• Analyzing quality-related issues using the Seven Basic Tools of Quality

Notable definitions

While there is no universally agreed definition of TQM, it has been proposed by a number of major organizations. These are some of them:

United States Department of Defense (1988)

"In the Department of Defense, Total Quality Management (TQM) is a strategy for continuously improving performance at all levels and in all areas of responsibility. It integrates fundamental management concepts, existing improvement efforts, and specific technical tools into a disciplined structure aimed at improving all processes continually. Improved performance is aimed at meeting broad objectives such as cost, quality, timeliness, and mission necessity and suitability. The primary goal is to improve user satisfaction. Dr. W. E. Deming, Dr. J. M. Juran, and others pioneered TQM, and it benefits from both commercial and public sector expertise with continuous process improvement."

British Standards Institution standard BS 7850-1:1992

"A management philosophy and organizational practices that strive to harness an organization's human and material resources in the most effective way to achieve the organization's objectives."

International Organization for Standardization standard ISO 8402:1994

"A quality-focused management style for an organization, based on all members' engagement and aimed at long-term success through customer satisfaction and benefits to all members of the organization and society."

The American Society for Quality

"A phrase that was first used to describe a management strategy to improving quality. TQM has taken on many other meanings since then. Simply described, it is a management strategy for achieving long-term success by focusing on customer pleasure. TQM is built on all employees in a business contributing to the improvement of processes, products, services, and the workplace culture. The teachings of quality leaders like Philip B. Crosby, W. Edwards Deming, Armand V. Feigenbaum, Kaoru Ishikawa, and Joseph M. Juran include the methods for adopting this approach."

The Chartered Quality Institute

"TQM is a management concept that enables a company to meet stakeholder requirements and expectations efficiently and effectively while maintaining ethical ideals."

Baldrige Excellence Framework

The Baldrige Award, established by Public Law 100-107 in the United States, honours American businesses, educational institutions, health-care organizations, and government or non-profit organizations that are role models for organizational performance excellence on an annual basis. Organizations are evaluated based on seven different types of criteria:

1. Leadership
2. Strategy
3. Customers
4. Knowledge management, analysis, and measurement
5. Workforce
6. Operations
7. Results

Standards

Attempts to standardize TQM were made in the 1990s by standards groups in Belgium, France, Germany, Turkey, and the United Kingdom. While several of these standards have subsequently been expressly dropped, they are all effectively superseded by ISO 9000:

- *Total Quality Management: Guide to Management Principles, London, England: British Standards Institution, 1992*, ISBN 9780580211560, OCLC 655881602, BS 7850
- *Electronic Components Committee (1994), Guide to Total Quality Management (TQM) for CECC-Approved Organizations, Brussels, Belgium: European Committee for Electrotechnical Standardization, CECC 00 806 Issue 1*
- *System zur Zukunftssicherung: Total Quality Management (TQM),* Düsseldorf, Germany: Verein Deutscher Ingenieure, *1996*, OCLC 632959402, *VDI 5500*
- *Total Quality and Marketing/Management Tools*, Paris, France: AFNOR, *1998, FD X50-680*
- *Total Quality Management: Guide to Management Principles, Turkish Standards Institution (TSE), 2006, TS 13133*

2. Literature Review

E. Vassilakis & G. Besseris, (2010), The goal of their work is to present a simple method for adopting basic statistical process control (SPC) concepts in aero-engine maintenance processes while incorporating problem-solving intonations. To assist in gathering and monitoring crucial aero-engine data, the inspection process approach is offered by the authors. A Pareto analysis is used by the authors to classify observed flaws, which is aided by a cause-and-effect diagram. Based on operating curves created expressly for their case

study, a binomial process capability analysis is done on nonconforming aero engines. A six-month time frame is represented in the experimental analysis time frame by the authors in their study. According to the authors a considerable percentage of aero-engines could benefit from a more progressive maintenance program that relies on predictive maintenance on the path to building a more effective Total Productive Maintenance scheme.

E. Vassilakis & G. Besseris, (2009), in their study attempts to identify the causes behind the defect observed and form the scientific platform for initiatives in a TQM-governed enterprise, as well as to broaden the principles of TQM for the selected process, before moving to a more structured plan that will include the entire unit, the authors in their paper devoted a description and evaluation of a selected maintenance process (assembly) at the aero-engines maintenance unit of a large aerospace company using TQM tools. Control charts were used by authors to organise process monitoring and evaluation in order to provide crucial information about the level of control in the chosen process. Control charts were used by the authors to compare quality control data to component specifications, providing a statistic for the degree of the process capability index. As a result, a Fishbone diagram was created by the authors in order to discover any existing interrelationships between the causes of the fault. The construction of an aero-engine module (exhaust nozzle unit) at a large aerospace company's aero-engines maintenance unit was chosen by the authors as the maintenance procedure. The use of multivariate control charts and tolerance analysis by the authors to evaluate the process yielded poor results. It was discovered by the authors in their study that some measuring stations were out of control, while others had low actual capability index readings.

Dawna L. Rhoades & Blaise Waguespack Jr, (2005), the authors considers, data on service and safety quality was acquired from Department of Transportation records from 1996 to 2004. Each carrier's safety rate was computed by the authors by multiplying the total number of accidents, incidents, near-mid-air collisions, and pilot deviations by the number of yearly departures. The service rate was computed by the authors by multiplying the total number of complaints by the number of yearly departures. The authors estimated averages and confidence intervals. The means of the groups were subjected to analysis of variance by the authors in their work. The outcomes of their study show that the low-cost carrier group evaluated here has closed the safety quality gap with its traditional rivals, producing safety rates that are not statistically different from traditional carriers over the study period. However, it has failed to address the issue of basic service quality as a group, resulting in a statistically lower level of quality.

Massoud Bazargan (2016), in his research, proposed a mathematical model for minimizing the overall cost of heavy maintenance programmes over a planning period, assuming that all maintenance programmes are completed on schedule and that no additional limitations exist. The findings of his study are both positive and counterintuitive. More expensive and labor-intensive checks should be outsourced, according to the solutions by the author. The overall maintenance cost breakdown is broken down in depth, with ramifications and recommendations in the authors study.

Kevin M. Taaffe et al (2014), The authors research team was tasked with analyzing the efficiency of the site's existing performance indicators that are used to help a company achieve and maintain success throughout their study with Lockheed Martin. As per the authors it is difficult to assess whether or not the firm is fulfilling requirements or making desired improvements without the usage of performance measurements. According to the author, a performance metric's success is influenced by five major factors. A metrics scorecard was designed by the authors as a standardized means of determining whether or not a statistic contains the proper mix of these features. The scorecard survey created by the authors was helpful in showing both positive and negative metric use. The Document Rejects measure has been modified in the quality department by the author and is no longer part of the executive's metric deck. It was also suggested by the authors that root cause analysis be included, as well as quantifying and tracking the cost of non-conformance and overall quality costs. The authors study shows that the overall amount of metrics on the site has lowered from 75 to 50. In conjunction with the use of the metric scorecard tool developed in the authors in their study, the remaining 50 metrics are undertaking a continual improvement process.

A. Gališanskis (2004), According to his study, whether a major or small aviation firm, a quality assurance system and its management are critical. As per the author the quality system's final duty is to ensure a high degree of quality in the technical aircraft maintenance system, ensuring the aircraft's airworthiness. Total Quality Management (TQM) is gaining traction in civil aviation these days as a new paradigm. As per the author Quality is critical for maintenance organizations for a variety of reasons, including the organization's existence and market competitiveness. The author in his study also stated how TQM is inextricably linked to the execution of the ISO 9000:2000 family of standards and encompasses a wide range of additional factors, including staff qualifications and training. As per the author an audit, conducted by oneself or by a third party, can be used as a control tool.

Anna V. Chatzi, (2018), Most military aviation organizations have not improved their safety management system to harmonize with civil aviation, according to his research. As per the study by the author any civil aviation organization's safety culture is the foundation, allowing employees to communicate efficiently and be completely aware of and extrovert about safety. As per the author safety culture is linked to both just culture and reporting culture & both are part of the awareness process, which helps to promote safety. The military aviation can benefit from these various aspects and safety management systems (SMS). His study attempts to show and debate SMS as a solution for military aviation organizations, including its philosophy, structure, and elements. With reference to the appropriate

frameworks and rules governing SMS operation, the features of civil aviation SMSs are given and discussed in the authors study. The author's work includes a discussion of the issues faced by military aviation organizations, as well as a brief assessment of a European Union military aviation organization. The author advises that the European Military Airworthiness Requirements, which are based on a set of guidelines developed by the European Aviation Safety Agency, can be used to create military aviation SMSs. The author also said that many defense forces that have implemented such aircraft safety systems have used a civil-based strategy that has been combined with military culture when needed.

S.C. Mukwakungu at al (2020), The results of an examination of the effectiveness of rolling stock maintenance (RSM) on quality assurance (QA) at South Africa's leading rail, port, and pipeline enterprise, as a case study conducted at its Koedoespoort depots and factories, are presented in their research. The researchers used a quantitative technique that was descriptive in nature to obtain insight into the research problem and assess the effectiveness of RSM on QA at a freight rail company. The information was gathered by the authors from a sample of 30 engineering division employees who were chosen at random. According to the information gathered by the authors, the engineering division lacks a criterion for monitoring the efficiency of the existing maintenance plan, as well as a maintenance system that is well understood by craftsmen and technicians. The recommendations by the authors stressed a continual training program for the entire engineering division on quality planning and implementation to guarantee that the suggested maintenance strategy performs as intended the first time.

Terry D. Moore et al (2007), The authors in their study used results of interviews and Delphi surveys led to the creation of a quality assurance staffing effectiveness matrix in the authors study. The matrix was used by the authors to determine the historical efficacy of quality assurance staffing at 16 Air Force combat aircraft units. For 25 indicators, effectiveness scores were then regressed on unit historical data by the authors. Break rates, cannibalization rates, flying schedule effectiveness rates, key task list pass rates, maintenance scheduling effectiveness rates, quality verification inspection pass rates, repeat rates, dropped object counts, and safety/technical violations counts were all deemed statistically significant yb the authors in their research work. An example benefit-cost analysis for changes in quality assurance staffing effectiveness provides convincing evidence to the authors for maintenance managers to carefully consider options to leave quality assurance personnel slots empty or to assign individuals with credentials that are not permitted.

Mark Goh and Fang-Seng Lim, (1996), Their research outlined the TQM adoption process at a Singapore-based aircraft maintenance company that fixes aeroplane engine blades. The rework rate and repair turn time of the blade part of the engine turbine were improved by the authors using very simple total quality concepts and tools. The nature of extended repair turn times and high rework rates, as well as their causes, were identified and analyzed by the authors using data acquired between May 1994 and January 1995. Quality improvement teams were developed by the authors in the research specifically to assist in the implementation of solutions in areas highlighted by management. The preliminary findings of the authors research work are promising. Repair turnaround times and rework rates have both decreased significantly. In addition to meeting quality improvement goals, intangible benefits such as enhanced communication and teamwork have been noticed by the author in their research wokr. To put the study in context, problems experienced during TQM adoption are discussed by the authors, as well as success factors.

3. Identification of Barriers Of Total Quality Management

1) Lack Of Initial Support – As per the study by Mark Goh and Fang-Seng Lim, (1996) lack of support from the top management at the starting days of TQM implementation have adverse effect on an organization’s quality movement.
2) Absence from Meetings - As per the study by Mark Goh and Fang-Seng Lim, (1996) absence from meeting related to quality improvement by employee & top management have a bad effect on quality as the top management’s goal for quality improvement cannot be passed on to the employees.
3) Reluctance to Disclose Information - As per the study by Mark Goh and Fang-Seng Lim, (1996) if the employee of an organization does not disclose the information related to areas causing problem to respective departments then the process cannot be improved & hence quality is affected.
4) Employee Reluctance To Complete Work On Time - As per the study by E. Vassilakis and G. Besseris (2010) & Kevin M. Taaffe et al. (2014) the reluctance by an employee towards his work can lead to some defects in the services & products provided by the organization. It can also affect the closure of quality document, hence affecting the quality information availability.
5) Consumer Complaints – As per the study by Dawna L. Rhoades and Blaise Waguespack Jr's (2005) consumer/customer complaints are a big factor that determines decreasing quality in the products or services provided by the organization.
6) Non-Conformance – As per the study by Kevin M. Taaffe et al. (2014) non-conformance to the quality procedures or steps by an employee leads to the decrease in the quality of the products & services provided by the organization.
7) Incompetency Of Employee – As per the study by E. Vassilakis and G. Besseris (2010) & Terry D. Moore et al. (2007) incompetency of employee leads to major accidents or mojar lapse in providing quality to the customers of the organization.
8) Improper Planning – As per the study by Massoud Bazargan (2016) improper planning of the process layout or raw materials can cause an increase in cost to the organization & also affect the quality of the services provided by the organization.

9) Absence Of Root Cause Analysis – As per the study by Kevin M. Taaffe et al. (2014) if root cause analysis is not done for an area showing problems, then the cause of the problem is not identified which will affect the quality of the product
10) Improper Paper Work – As per the study by Kevin M. Taaffe et al. (2014) affects the quality of the product as the quality record is not made available to the respective team/department which can lead to rejection of the product while inspection.
11) Absence Of Statistical Process Control/Analysis – As per the study by Vassilakis and G. Besseris (2009) & A. Gališanskis (2004) absence of statistical process control can lead to increase in the cost of manufacturing of the product & the shortcoming are not identified which affect the quality of the products.
12) Improper Examination Of Audit Results – As per the study by A. Gališanskis (2004) if the audit results are not worked upon properly it may affect the quality of the product or services.
13) Lack Of Communication – As per the study by Anna V. Chatzi, (2018) in military organization communication is governed by some rules which affect in development of reporting culture ultimately affecting the safety culture in the organization.
14) Lack Of Training – As per the study by S.C. Mukwakungu et al (2020) if the employee is not properly trained then the employee won't be able to do the work assigned to him properly which affect the quality of the service provided by the organization.

S. No.	Barriers	Reference
1.	Lack Of Initial Support	Mark Goh and Fang-Seng Lim, (1996)
2.	Absence from Meetings	Mark Goh and Fang-Seng Lim, (1996)
3.	Reluctance to Disclose Information	Mark Goh and Fang-Seng Lim, (1996)
4.	Employee Reluctance To Complete Work On Time	E. Vassilakis and G. Besseris (2010), Kevin M. Taaffe et al. (2014)
5.	Consumer Complaints	Dawna L. Rhoades and Blaise Waguespack Jr's (2005)
6.	Non-Conformance	Kevin M. Taaffe et al. (2014)
7.	Incompetency Of Employee	E. Vassilakis and G. Besseris (2010), Terry D. Moore et al. (2007)
8.	Improper Planning	Massoud Bazargan (2016)
9.	Absence Of Root Cause Analysis	Kevin M. Taaffe et al. (2014)
10.	Improper Paper Work	Kevin M. Taaffe et al. (2014)
11.	Absence Of Statistical Process Control/Analysis	Vassilakis and G. Besseris (2009), A. Gališanskis (2004)
12.	Improper Examination Of Audit Results	A. Gališanskis (2004)
13.	Lack Of Communication	Anna V. Chatzi, (2018)
14.	Lack Of Training	S.C. Mukwakungu et al (2020)

4. Discussion

Vassilakis and G. Besseris (2009) found that the aerospace business they researched was one of the first in its host country to deploy a quality assurance system. As a result, we have over 30 years of experience in documenting, implementing, and continuously assessing the quality system from both internal and external auditors. Despite its extensive expertise, product nature, and sound quality system documentation, the aero-engines maintenance unit is still far from implementing a functional overall quality management system. SPC can give the tools needed to prevent such problems during the early stages of manufacturing, saving both money and time. However, the mass of the company's divisions that aren't deemed "production lines," such as the aero-engines maintenance unit, lack SPC and the associated control engineering divisions. The short period of SPC tool deployment at the aero-engines maintenance unit revealed an out-of-control assembly process with low capability indexes; a problem that could have been remedied had an SPC process control and monitor been installed. E. Vassilakis and G. Besseris (2010) conducted an ABC analysis based on data from reports generated at the

aero engines' test cell, which comprised both partially repaired and overhauled aero engines. The Pareto chart that resulted revealed that problems classified as "unacceptable performance" and "oil system issues" were responsible for 72.1 percent of the aero engine rejects. A more detailed ABC study of the "unsatisfactory performance" defect revealed that "turbine vibrations" and "High/Low Turbine inlet Temperature (TIT)" were the flaws responsible for 71.63 percent of performance-related rejections. After the ABC study was completed, a quality team of senior and middle level employees created a cause and effect diagram identifying and analysing the variables leading to unbalanced turbines to serve as a "road map" in eliminating this fault from the aero engine maintenance process. Six months after TQM concepts were implemented at the rotors workshop, a process capability study was conducted. According to the plant's management, the results indicated clear indications of progress. The control chart plot indicated an in-control process with a faulty rate of 9.88 percent and a Z value of 1.29. According to the conclusions of Dawna L. Rhoades and Blaise Waguespack Jr's (2005) study, the LCC group studied here has narrowed the gap on their traditional opponents in terms of safety quality, posting safety rates that are not statistically different from traditional carriers over the study period. However, they have yet to address the issue of basic service quality as a group, resulting in a statistically lower level of quality (as measured by consumer complaints). The problem of service failures is essential because service quality is far more obvious to consumers. If these carriers expect to continue to attract customers away from established carriers, particularly the highly valued business traveller, they must close this service quality gap. Massoud Bazargan (2016) offered a quantitative technique to assist airlines in determining cost-effective options for in-house and outsourced heavy maintenance operations. The expense of aeroplane maintenance rises dramatically as the aircraft gets older. That is, as the planning periods lengthen, the aeroplanes age and hence require more costly maintenance. The average yearly maintenance cost index for the Airbus 320 fleet as they age, for example. The maintenance costs increase dramatically every cycle, which is typically nine years for this type of fleet, as the indices show. As aeroplanes get older, in-house maintenance costs rise faster than outsourced maintenance costs. As a result, as the planning horizons lengthen, the aircraft age and the cost disparity between in-house and outsource grows. Kevin M. Taaffe et al. (2014) proposed that an updated measure display the number of documents that need to be closed within 30 days of delivery for any aircraft. Documents that have yet to be closed as well as documents that have been rejected are both examples of open documents. As the delivery deadlines approach, executives and managers will have a figure to work towards. It was also suggested that, in addition to the aforementioned suggestions, root cause analysis be included, as well as quantifying and tracking the cost of non-conformance and the total cost of quality. Lockheed Martin presently collaborates closely with its clients and consumers, seeking feedback on a regular basis. Root-cause statistics on product non-conformances should be kept to help discover which areas of the organisation are creating the most rework problems, which is clearly a useful metric for the company. The examination of prior audit results is crucial to the continuing growth of a quality assurance system. These findings must be matched to the time period under consideration. Statistical examination of quality metrics allows for a more in-depth investigation of shortcomings, as well as the acceleration of preventative actions and quality system enhancements. Statistical analysis can help solve problems and keep track of a quality system (A. Gališanskis (2004)). In military organizations, communication is governed by a combination of generic military communication norms/rules and aviation-specific standards. Furthermore, the fragmentation of information and norms adds to the difficulty of developing a reliable reporting system. Evidently, reporting culture and just culture are two desirable attributes in aviation organizations that have a beneficial impact on safety culture and promotion, as well as contributing to a successful Safety Management System. Furthermore, the importance of effective communication, teamwork, and decision-making in the development of aviation safety culture is recognized (Anna V. Chatzi, (2018)). S.C. Mukwakungu et al (2020) suggest that management plays an important role in locomotive maintenance by requiring regular meetings with production personnel to discuss locomotive performance and repair activities. It is critical that artisans and technicians contribute to the enhancement of maintenance strategies and modifications made to locomotives in order to attain a high degree of dedication to maintenance activities. Maintenance operations require strict training, as new technologies and tactics may be developed to carry out successful maintenance programmes. All of the efforts will likely be in vain unless the artisans are capable of executing the maintenance. Terry D. Moore et al. (2007) make a number of suggestions. To begin, managers should examine the relationship between quality assurance skill-task mismatching and organizational performance using the staffing effectiveness metric. Second, managers of military aircraft maintenance quality assurance units should conduct analyses to identify the strength and direction of any correlations between their unit's assessed quality assurance personnel effectiveness and its performance on the nine criteria listed. This will allow them to examine the effectiveness of quality assurance staffing as a potential contributing cause for inadequate areas identified by their metrics, and make the necessary personnel decisions. TQM's success is contingent on a number of things. They'll be mentioned as Focus on the long term, Set attainable objectives, Structure of QITs, Ownership, Visibility across the organization, Support and commitment from senior management. There is no such thing as a trouble-free change, process, or organisation implementation. To provide a balanced perspective, the key issues faced in TQM implementation are Initial lack of support, Inability to attend meetings, Information withheld due to apprehension, Other intangible benefits exist in addition to meeting the measurable QIT objectives. These are indicated as Communication and cooperation have improved, Changes in management style & Employee mentality shift (Mark Goh and Fang-Seng Lim, (1996)).

5. Conclusion

The barriers of Total Quality Management in aircraft maintenance have been identified in this paper. Consumer complaints, employee reluctance to complete work on time, non-conformance, Incompetence Of Employee, Initial lack of support, Inability to attend meetings,

Information withheld due to apprehension, improper planning, Lack of Root Cause Analysis, Improper paper work, absence of statistical process control/analysis, Improper examination of Audit Results, Lack Of Communication, Lack of Training are the barriers of Total Quality Management that can prevent an organization or a company from providing quality products to its customers. These factors if not worked upon by an organization can also lead the loss of market share, customer base & finally less profit. The same can be used for future work by taking the list to a field/practical based project or a case study based research work.

6. References

1) E. Vassilakis G. Besseris, (2010),"The use of SPC tools for a preliminary assessment of an aero engines' maintenance process and prioritisation of aero engines' faults", Journal of Quality in Maintenance Engineering, Vol. 16 Iss 1 pp. 5 – 22.

2) Dawna L. Rhoades Blaise Waguespack Jr, (2005),"Strategic imperatives and the pursuit of quality in the US airline industry", Managing Service Quality: An International Journal, Vol. 15 Iss 4 pp. 344 – 356.

3) Massoud Bazargan , (2016),"Airline maintenance strategies – in-house vs. outsourced – an optimization approach", Journal of Quality in Maintenance Engineering, Vol. 22 Iss 2 pp. 114 – 129.

4) Kevin M. Taaffe and Robert William Allen (2014), “Performance metrics analysis for aircraft maintenance process control”, Journal of Quality in Maintenance Engineering Vol. 20 No. 2, 2014 pp. 122-134.

5) A. Gališanskis (2004) Aspects of quality evaluation in aviation maintenance, Aviation, 8:3, 18-26.

6) Anna V. Chatzi, (2018) "Safety management systems: an opportunity and a challenge for military aviation organisations", Aircraft Engineering and Aerospace Technology.

7) S.C. Mukwakungu, Z. Sibeko and C. Mbohwa, “The Effectiveness of Rolling Stock Maintenance on Quality Assurance at the Largest South African Rail Company” Department of Quality and Operations Management, University of Johannesburg, Johannesburg, South Africa.

8) Terry D. Moore Alan W. Johnson Michael T. Rehg Michael J. Hicks, (2007),"Quality assurance staffing impacts in military aircraft maintenance units", Journal of Quality in Maintenance Engineering, Vol. 13 Iss 1 pp. 33 – 48.

9) Mark Goh Fang-Seng Lim, (1996),"Implementing TQM in an aerospace maintenance company", Journal of Quality in Maintenance Engineering, Vol. 2 Iss 2 pp. 3 – 20.

10) E. Vassilakis G. Besseris, (2009),"An application of TQM tools at a maintenance division of a large aerospace company", Journal of Quality in Maintenance Engineering, Vol. 15 Iss 1 pp. 31–46.