Implementation of Quality Management System in a Manufacturing Industry

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Abstract— Manufacturing Industries are the most important and largest organization of any country. The new standard ISO 9001:2015 is a way for an organization to manage Internal and External customer satisfaction and demonstrate continuous improvement. These sectors have taken some managerial changes by conducting audits (internal and external) and reforms according to IS/ISO standards to increase its managerial strength, customer satisfaction and the quality of product at low cost. But some problems have arisen that may terminate the Quality Management System activities. So it is important to identify and analyze the barriers that affect the implementation of a quality management system (QMS): ISO 9001:2015. ISO 9001 is a standard that sets out the requirements for a quality management system. It helps businesses and organizations to be more efficient and improve customer satisfaction. A new version of the standard, ISO 9001:2015, has just been launched, replacing the previous version (ISO 9001:2008).

Key words: ISO 9001:2015, QMS, IMS, EMS, OHSAS, IS/ISO

I. INTRODUCTION

Quality Management System (QMS) certification has become a must in today's highly competitive market. One of the most common methods of quality management system application to a construction company is ISO 9001: 2015 certification. While the reason for many companies wishing to achieve a quality management certificate, like ISO 9001, is only for eligibility to enter tenders, some other companies seek for ISO certification to benefit genuinely from its numerous advantages. However, manufacturing companies face a number of difficulties in the certification process, including an increase in paperwork, an improper documentation system and poor communication among personnel. As a result, these may cause re-working, as mentioned by Alshawi and Ingirige, low worker interest in applying new working methods, and low employee morale and motivation. These problems make the certification process arduous and thus some companies might even give up. ISO 9001 is a standard that sets out the requirements for a quality management system. It helps businesses and organizations to be more efficient and improve customer satisfaction. A new version of the standard, ISO 9001:2015, has just been launched, replacing the previous version (ISO 9001:2008). ISO standards are reviewed every five years and revised if needed. This helps ensure they remain useful tools for the marketplace. The challenges faced by business and organizations today are very different from a few decades ago and ISO 9001 has been updated to take this new environment into account.

The purpose of a QMS is "To establish a framework of reference points to ensure that every time a process is performed the same information, methods, skills and controls are used and applied in a consistent manner" (Dale, 2007, pp. 280). In addition to internal benefits, organizations that have implemented a QMS are able to demonstrate that they have the capabilities to supply the same goods and services to clients all around the world. Those organizations with certifications to a recognized QMS such as ISO 9001 are able to export their products to international markets more easily than those that do not have it.

A. ISO Policies and Standards

1) Integrated Management system

- ISO 9001:2015 (Quality policy)
- BS EN ISO 14001:2015 (Environment policy)
- BS OHSAS 18001:2007 (Safety Management policy) Energy Management system
- BS ISO 50001:2011(E)

II. LITERATURE REVIEW

The literature review of this research is to be conducted to enable the researcher to know and understand the concepts, theories, models and current knowledge on QMS ISO 9000 & 9001:2015. The aim of the literature review is to review the published work in the area of ISO 9001:2015 standards and their implementation, also to enable the researcher to identify the barriers, which face the organizations, to be certified with the certification at or after the registration. It was intended to enable the researcher to recognize the relevant research aim, objectives, research question, developed the conceptual framework of this study and the suitable methodology to conduct the research. In order to analyze these benefits arising from the ISO 9001 standard, some authors examine its effects through a list of benefits, whereas others base themselves on, or even propose a classification of such benefits. Such is the case of Lee (1998), who classifies benefits into benefits gained with respect to internal operations (better team spirit, less staff conflict, reduced wastage, increased efficiency, shorter lead time), benefits gained with respect to customer relations (improved sales through new customers, longer contracts with existing customers, less control from existing customers, fewer complaints from existing customers), and benefits gained with respect to subcontractor relations (subcontractors to become certified, better relations with subcontractors, more stringent control over subcontractors). several studies provide evidence of certified firms outperforming non-certified firms (Heras, Dick & Casadesús, 2002; Corbett, Montes-Sancho & Kirsck, 2005; Sharma, 2005). This improvement is attributed largely to improvement in internal business processes. In this

context, other studies also show that ISO 9001 certification is not associated with significant financial performance in the longer term, or that there is no significant difference between the impacts of Quality Management on financial performance for firms with and without ISO 9001 certification (Häversjö, 2000; Singels, Ruël & van de Water, 2001, Tsekouras, Dimara & Skuras, 2002). These ideas indicate that, although there are firms that do succeed in improving their financial results (for instance, their market share and their sales, because the quality certificate opens the door to certain customers), there are many others that do not manage to attend any improvement. The global adoption of ISO 9001 may be attributable to a number of factors. A number of major purchasers require their suppliers to hold ISO 9001 certification. In addition to several stakeholders' benefits, a number of studies have identified significant financial benefits for organizations certified to ISO 9001, with a 2011 survey from the British Assessment Bureau showing 44% of their certified clients had won new business. Corbett et al. showed that certified organizations achieved superior return on assets compared to otherwise similar organizations without certification.

Years	2012	2013	2014	2015	2016
No. of Certificates issued by ISO	1, 118, 510	1, 111, 698	1, 096, 987	1, 126, 460	1, 138, 155

Table 1: No. of Certificates issued by ISO

A. Gap Analysis

The Gap analysis identifies gaps between the optimized allocation and integration of the resources, and the current allocation level. This revels the area to be improved. Gap analysis involves determining, documenting, and approving the difference between business requirements and current capabilities. Here the gap analysis are made by the audit report, literature review and Researching in Jindal manufacturing Limited, Raipur (Machinery Division).

By which I have found some gaps which are identified by Audit. The main purpose of Audits are -

1) To examine the quality management practices or the lack of it in the industry.
2) To develop a quality initiatives implementation guidelines for the industry.
3) To find out the reasons for continuation of ISO certificates.
4) To find out the proper documentation and records as per ISO standards.

III. PROBLEM IDENTIFICATION

To find out the problems or Barriers Affecting the Implementation of Quality Management System (QMS) - ISO 9001:2015 in Manufacturing Industries. We have to understand the layout of the ISO 9001:2015, its working and implementation in industry. There are some clause which should be followed by the organization as per ISO Standards. After the implementation of 9001:2015 we are able to analyze the problems and barriers in our organization by conducting audit program to find out non-conformities. After finding non-conformities in any department of the organization, a suggestion is made by auditor to take corrective action for removal of non-conformities. These non-conformities affect the quality of product, Services and Production which also affects the customer satisfaction. The analysis of last few years can also show the barriers which prevent to achieve the growth of organization. Here in my problem identification method, I have attended both the audits (internal & external) and study the previous year data and also the assessment report.

This IS employs the process approach, which incorporates the PLAN-DO-CHECK-ACT (PDCA) cycle and risk-based thinking.

To find out the problems-

- Understanding the layout of ISO 9001:2015
- Conducting both Internal and External Audit
- Data Analysis and Non-Conformities

ISO 9001:2015 Quality management systems Requirements is a document of approximately 30 pages which is available from the national standards organization in each country. Only ISO 9001 is directly audited against for third party assessment purposes.

Contents of ISO 9001:2015 are as follows:

- Section 1: Scope 2.
- Section 2: Normative references
- Section 3: Terms and definitions
- Section 4: Context of the organization
- Section 5: Leadership
- Section 6: Planning
- Section 7: Support
- Section 8: Operation
- Section 9: Performance evaluation
- Section 10: Improvement

Problem Identification by Audit- Audit is an official inspection of an individual's or organization's accounts, typically by an independent body. In any industry basically two types of audit are conducted. One is Internal and other is External.

- Internal Audit-This audit is done by the internal members of the industry and keep a record of every departments and findings as per IS/ISO standards.
- External Audit-This audit is done by the third party (externals). The auditors come from the company who did certification of IS/ISO.

IV. DATA COLLECTION

A. Audit

An official inspection of an individual's or organization's accounts, typically by an independent body. The audit will be done by:

- By Random sampling.
- Verification of all documents (should be legal and approved by organization head or respective departments).
- Verification of Processes & Systems as per the standards and guidelines of Management.
- Checking shift routine of employees.
- Checking policies,

1) Quality Policy
2) Environment Policy
3) Health and safety Policy
4) Energy Management Policy

B. Customer Complaints Report Analysis

This is the table which shows the reduction in customer complaints due to the implementation of Quality Management System at JSPL, Raipur

Sr. No.	Years	No. of Customer Complaints
1.	2014	08
2.	2015	05
3.	2016	03
4.	2017	02

Table 2: Number of customer complaints are reducing year wise year at JSPL

From the above table number of customer complaints are reducing year wise year at JSPL (Jindal Steel & Power Limited), Raipur Machinery Division. It shows that the by better implementation of ISO 9001:2015 Quality of product is improving and hence the number of customers are increased. Every year after audit, non-conformities are corrected hence it has been seen in report that quality of product and service is improving.

C. System Audit Report

Audit No.-c-33		Date of Audit- 13-6-2017	
Department- Machine Shop		Auditors-	
S/ No.	Activity Audited	Relevant clause nos. of standards QMS	No. of NCR
1.	Operational planning and its control	8.1	C
2.	Operational planning and its control	8.1	C
3.	Document numbering	7.5.3	C
4.	Gauge recording and control system	8.1	OBS
5.	Calibration check	7.1.5	C
6.	In process inspection	8.5.1,8.7.1,8.6	OBS
7.	Machine utilization	7.5.1	C
8.	Organization chart	5.3	C
9.	Roles and responsibilities	5.3	C
10.	Policy	5.2	C
11.	Objectives	6.2	C
12.	Health checkup of machines	8.4	C
13.	Identification & Traceability	8.5.2	NCR
14.	Identification / Traceability	8.5.2	OBS

Table 3: System Audit Report

The Seven Most Important ISO 9001:2015 Audit Questions.

- What can you tell me about the context of your organization?
- Who are your interested parties and what are their requirements?
- What risks and opportunities have been identified, and what are you doing about them?
- What plans have been put in place to achieve quality objectives?
- How has the QMS been integrated into the organization's business processes?
- How do you manage change?
- How do you capture and use knowledge?

1) Checklist for Audit

- Department_____ Name of Auditor_____
- Date of Audit_____

Sr. No.	Point to be checked	Clause No.(QMS)	Observations	C/NC	Remark
1.	In process inspection	8.5.1, 8.7.1, 8.6	During Audit it was found that self-inspection report filled by the machine shop is not signed by the QA inspector.	OBS.	To be signed by the QA inspector.
2.	Identification/ Traceability	8.5.2	During the audit it was found that foundry material item-gasifier was shifted from foundry after heat treatment which was found without identification mark.	NCR	This is NCR to foundry department that without proper inspection, the material has been shifted.
3.	Gauge record & Control System	8.1	Gauge no. 8- pulley radius gauge seen. it was observed that 2 nos. of gauge of same nos. i.e. no. 8 were found.	OBS.	Chances of mistakes

Table 4: Audit Report

D. Finding of NC(s)

The above checklist is for workshop. It shows the findings of the Audit and other Observations, NC's. These are followings-NC- There is 1 NC.

- This is NCR to foundry department that without proper inspection, the material has been shifted to workshop without identification and without informing' OBS. There are 3 obs. found by audit.

1) In process inspection - Self inspection report/final inspection reports are to be signed by the QA inspector.
2) Gauge record & Control System - Chances of mistake may happen, however issue register maintained.

3) Identification/Traceability - Side frame which was kept in assembly received after machining was found no identification number.

V. RESULTS

The data collection by audit shows the result that there are one non-conformities which needed to be solved. The corrective action should be taken by the respective department as soon as possible and provide the information about the action taken by them to Audit team and also tell them about the improvement in the performance.

A. Non-Conformities

The non-conformities have found in Identification & Traceability with respect to the clause 8.5.2(QMS). During the audit it was found that foundry material item-gasifier was shifted from foundry after heat treatment which was found without identification mark. This is NCR to foundry department that without proper inspection, the material has been shifted to workshop without identification and without informing.

B. Observations

There are 3 OBS. found after audit which are suggested to take care of them by proper working and keeping record updated and if there are any issue then consult with the auditor for corrective action

C. Corrective Actions- Foundry Department take the following corrective actions

- Make a record file for the shifting of material which content the record of date, time and the person under which the material has been shifted.
- Reason of shifting and proper handling of material during shifting.
- Identification marking is necessary.

After applying the corrective action we found that there is a record file for the material handling and identification. They made a new file and format for keeping records.

VI. CONCLUSION AND SCOPE FOR FUTURE WORK

A. Conclusion and Discussion

The study of QMS shows that the benefits of IS/ISO standards and how improvement can be done by the audit and inspection at a certain time intervals in our organization. This improves the quality of product and makes a good relationship between employer, employees and customers. The auditor discussed his observations with those charged with governance, such as the audit committee, before finalizing the report. The auditor should be firm in his opinion and exercise his independence at this level. This part of the audit is critical and calls for resilience on the part of the auditor. An audit report, being a public document, should be drafted skillfully. Such analysis helps the auditor to draw conclusions regarding various aspects of the line items of the financial statements which are beneficiary for organization. Now audit objectives have been achieved by the auditor and certificate scope remains appropriate. With the expectation of the non-conformities identified, the audit team concludes based on the results of audit. Corrective action with respect to non-conformities raised at last assessment has been reviewed.

- Checking of internal Audit Reports
- The new non-conformities if found.

All the preventive actions and corrective actions are taken by the organization which is suggested by the auditor and their team. Thus by following IS/ISO standards any organization can improve their quality management system and customer satisfaction. There are some important conclusions which are followings-

- All the points are checked by the auditor according to the ISO Standards.
- There is NC and OBSERVATION found then suggested corrective action should be followed, the details of corrective action and result will be send to the auditor.
- Finally after verifying all the documents and samples, the auditor decided to give continuation of IS/ISO certificates for working according to the standards, if fails to satisfy the auditor then certificate will be cancelled.
- Suggestions by the auditor are very beneficial for the organization to find out the hidden things or issue within the organization.
- After the successful audit program, we find that there is improvement in product quality and also both employees and customer are satisfied.
- The external audit is conducted by the top management yearly and internal audit as desired quarterly, half yearly or yearly.
- An assessment report is made by auditor which is very useful for the organization to implement the corrective action and keeping the records.

B. Scope for Future Work

The scope of the Quality management system and ISO 9001:2015 is as following-

1) Re-assess status of your QMS: too much documentation? User friendly? Is it possible to integrate other compliance criteria into one manageable system?
2) Talking to your certification body auditor.
3) Train/educate staff including your internal audit team & those responsible for the about the changes.
4) Create a transition plan that maps out how you will manage the process to achieve ISO 9001:2015 certification.

C. Recommendations

After attending the Audit program, I prepared some questionnaire and asked them to the employees. Whole Research is based on customer satisfaction and quality improvement. Here I give some recommendations -

1) Role clarity of each position should be defined and based on that individuals can plan their work accordingly.
2) Self-potential system should be encouraged.
3) There are regular review and comparison of current & past performance to detect gradual deterioration in the strategy.
4) It is very important to provide the opportunity to the employees of the organization to express their ideas or whatever they want to express.
5) Management should clear their vision, mission and goals towards the employees in the organization.
6) Management should involve the workers representatives in managerial activities so that the transparency could be

maintained and through this they can win the confidence of the employees.

7) Management should give due importance to mental relaxation & social cultural development of an employees who strives hard for the company.
8) Reward or Praise/appreciation works as magic for an individual and motivates them for work.

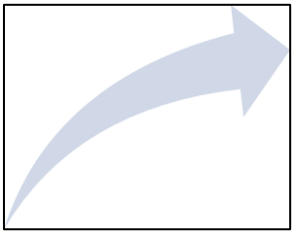

Fig. 1: Growth of Organization

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