



REQUIREMENT OF QUALITY MAINTENANCE IN SMES

Sujay Biswas¹, Dr. Abhijit Chakraborty², Ranajay Maji³

¹Department of Mechanical Engineering, Technique Polytechnic Institute, (India)

²Principal, Technique Polytechnic Institute, Dist-Hoogly, West Bengal, (India)

³Department of Mechanical Engineering, Technique Polytechnic Institute, (India)

ABSTRACT

Small Manufacturing enterprises is a small capacity product manufacturing firm. It is the first stage of industrial organisation in the industrial world where it can assist its comparatively large manufacturing organisation. On that basis quality is very important parameter to achieve the goal in competitive business society. The paper emphasizes on quality maintenance in small manufacturing enterprises (SMEs). The companies are dependent on SMEs. SMEs are acting as vendor for them. For fulfilling the order of the big companies the SMEs have to deliver the quality product within schedule time. This quality product can be achieved through quality maintenance. The maintenance concept in this paper distinguishes from other maintenance concepts by its use of preventive, predictive and proactive maintenance strategies.

Keywords: *Maintenance, manufacturing, Quality, Strategies.*

I. INTRODUCTION

Small manufacturing enterprises are labour intensive organisation. Plant and machinery investment are in small scale. Therefore it is not technologically updated and financially not so solvent. Maintenance has an important roles in the profitability of a manufacturing organisation. Profitability depends on quality of the products. At the present competitive market, manufacturing sectors can retain itself through the quality of its product. This quality can be achieved by maintenance strategies.

Quality maintenance means quality control of the products produced in industry. It does this by understanding and controlling the process interactions between manpower, material, machines and methods that could enable defects to occur. The key is to prevent defects from being produced in the first place, rather than installing rigorous inspection systems to detect the defect after it has been produced. Past and current maintenance practices in both the private and government sectors would imply that maintenance is the actions associated with equipment repair after it is broken.

From this point of view maintenance as follows: “the work of keeping something in proper condition; upkeep”. This would imply that maintenance should be actions taken to prevent a device or component from failing or to repair normal equipment degradation experienced with the operation of the device to keep it in proper working order. Unfortunately, data obtained in many studies over the past decade indicates that most private and government facilities do not expend the necessary resources to maintain equipment in proper working order. Rather, they wait for equipment failure to occur and then take whatever actions are necessary to repair or replace



the equipment. Nothing lasts forever and all equipment has associated with it some predefined life expectancy or operational life.

II. LITERATURE REVIEW

Total Quality Management is defined in ISO 9000 (2000) as "A management approach of an organisation, centered on quality, based on the participation of all its members and aiming at long-term success through customer satisfaction, and benefits to the members of the organisation and to the society". Ho and Fung (1994, p. 24) defined TQM, as "TQM is a way of managing to improve the effectiveness, flexibility, and competitiveness of a business as a whole. It is also a method of removing waste, by involving everyone in improving the way things are done".

Nakajima (1989), a major contributor of TPM, has defined TPM as an innovative approach to maintenance that optimizes equipment effectiveness, eliminates breakdowns, and promotes autonomous maintenance by operators through day-to-day activities involving the total workforce (Bhadury, 2000). Kutucuoglu et al. (2001) have stated that equipment is the major contributor to the performance and profitability of manufacturing systems. Seth & Tripathi (2005) have investigated the strategic implications of TQM and TPM in an Indian manufacturing set-up. In the middle of the eighties, there was growing interest in the study of maintenance models for systems with failure. These studies of maintenance are concerned with applying Total Quality Management techniques to the maintenance of both industrials and services processes where the main goal is to keep the firm in productive operation for as much of the time as possible (Al-Zubaidi, 1993).

III. DEPENDENCY OF QUALITY MAINTENANCE

Maintenance and quality is the related organ of the production system. An organisation reaches its high demanding market through quality and maintenance plays crucial role in that path.

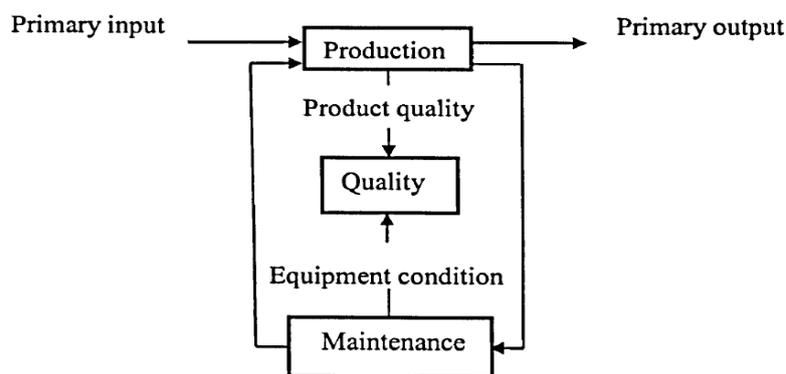


Fig. 1

In a production system the primary input is man, machines materials and output is finished goods. The product is inspected in various stages to improve its quality. The quality of the product not only depends on quality of raw materials but also on inspection, machines performance, etc. Machines conditions also improve quality.

IV. CASE STUDY

XYZ Company located at the Howrah district of West Bengal in India. It is continuing its business for 20 years with total number of 20 employees and its the annual turnover is around 10 lakhs. The leading product of the enterprise is small screw which is used in the domestic activity. In the competitive market this organisation cannot reach at the high demanding point of the customer due to lack of quality of the product. For these reasons, the top level management of the organization want to improve the quality maintenance system.

V. METHODOLOGY

The particular SMEs unit has been kept observation seriously. The quality of the product analyzed along with the report of the customer feedback. The information collected from purchase department. The past record of the quality maintenance studied. The interaction made with the hierarchy of the enterprise unit to find out present quality maintenance system. In that way a details analysis is made to determine the main cause of the lack of quality the product.

VI. ANALYSIS

Lack of product quality found

- i) No proper record is kept of the defective products.
- ii) The statistical interpretation and trend analysis is not done.
- iii) Negligence on the part of concern personals to find the root cause of the defect.
- iv) The control over incorrect operation is not done.
- v) Inadequate flow control is present.
- vi) No alarming system is there when at first using operation is done on the product.

VII. MAINTENANCE STRATEGY

Preventive maintenance is the maintenance activity which is done when the machines are shut down and Predictive Maintenance activities are carried out when the machines are running in their normal production modes. The proactive maintenance depends on rigorous machine inspection and condition monitoring. These maintenance are machine related but quality maintenance is emphasized on overall matter. Mainly, importance is given on quality of the product so as to the manufacturers can exist in the competitive market and earn profit. Quality maintenance begins from raw materials stage to finished goods. There is requirement of continuous inspection in every stages from raw material quality to end of the production processes. For the sake of this purpose, there has an important role of management that should followed according to given flow chart or model. Plan- Do- Check- Act is very important part of this model through which ultimate quality of the product will obtained and maintenance of the quality will be maintained in proper way and goal will achieved.

In Plan- Do- Check- Act circle, satisfactory product will generate through resource management, product realization, measurement and analysis and management responsibility. It will done in cyclic way.



Fig. 2

VIII. PROPOSED MODEL

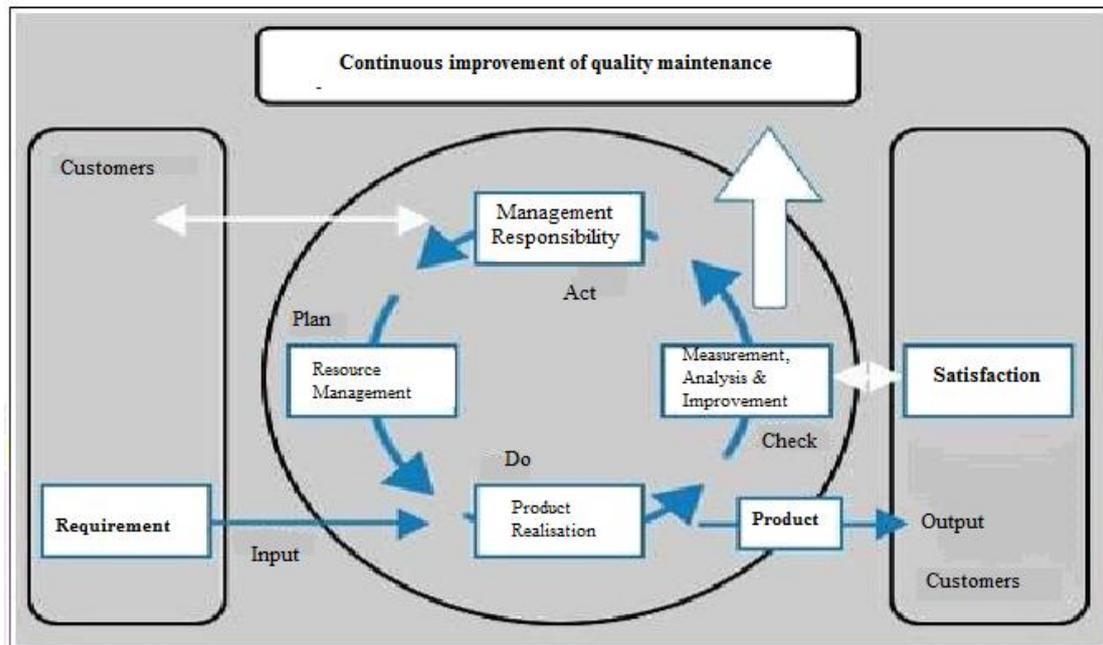


Fig. 3

The effectiveness of quality maintenance in SMEs can be achieved by the application of PDCA concept. It consists of proper management of resources in a fruitful manner having a of the product being manufactured in the factory and a through checking by various measurement techniques with a analysis for it betterment and further improvement. The aforementioned aspect can be obtained by the proper act on the part of the

management to take necessary action and support for the quality maintenance aspects that is going to ultimately benefit the SMEs.

All these are actually fulfilling the requirement of the customer and giving a higher level of satisfaction on the part of customers giving a good brand image for the SMEs.

IX. CONCLUSION

The SMEs have to put emphasis on quality maintenance. For doing so, some maintenance strategies are to be taken in this regard. The proper quality maintenance are going enhance the effectiveness of the system and improvement of productivity as well as reduction in the number of rejections. Quality maintenance to be from the initial stage of raw materials to the finished goods produced in the SME. Proper utilization of resources with realization of the product to be manufactured having adequate measurement techniques and analysis would improve and develop the quality maintenance approaches in the SMEs.

The SME by quality maintenance can develop its efficiency and improve its product quality and giving a better customer satisfaction in due course in the competitive market scenario.

REFERENCES

- [1] Al-Najjar, B. (1996). Total Quality Maintenance: An approach for continuous reduction in costs of quality products. *Journal of Quality in Maintenance Engineering*, 2-20, Vol 2, Number 3, 1996.
- [2] Ben-Daya, M. and Duffuaa, S. (1995), Maintenance and quality: the missing link, *Journal of Quality in Maintenance Engineering*, Vol. 1, No. 1, pp. 20-26, MCB University Press.
- [3] Cholasuke, C., Bhardwa, R. and Antony, F. (2004), The status of maintenance in UK manufacturing organisations: results from a pilot survey. *Journal of Quality in Maintenance Engineering*, Vol. 10 No. I pp. 5-15
- [4] Duffuaa, S. and Ben-Daya, M. (1995), Improving maintenance quality using SPC tools. *Journal of Quality in Maintenance Engineering* Vol. 1 No. 2, pp. 25-33 MCB University Press.
- [5] Hopp W. and Wu S., Machine maintenance with multiple maintenance actions, *IIE Trans.*, vol. 22(3), pp. 226-233, Sep.2002.
- [6] <http://www.techeduhry.nic.in/syllabus/computer%20engg/6comp.pdf>
- [7] International Organisation for Standardisation (ISO), online, The Principles of Quality Management. A available at: <http://www.iso.org/iso/en/iso9000-14000/iso9000/qhmtmpl>. (Accessed on 20-09-2004).
- [8] Kennedy P., TQM implementation is not a short-term fix programmed, *IIE Trans.*, vol. 26(4), pp. 231-235, 2005.
- [9] Mora S., Implementing total Quality Maintenance is not a difficult task, *IIE Trans.*, vol. 23(4), pp. 330-340, Sep.2002.s
- [10] Sherwin, D.J. and Jonsson, P. (1995) TQM, maintenance and plant availability'. *Journal of Quality in Maintenance Engineering*, Vol.1 No. 1, pp 15-19, 1995.