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The Impact of Total Productive Maintenance Practised In the Small and Medium Scale Industries

Fatehbir Singh Dhillon
Assistant Professor
Department of Mechanical Engineering
S.G.G.S.W.U
Fatehgarh Sahib

Dr. S.S Jolly
Professor and Head
Department of Mechanical Engineering
S.G.G.S.W.U
Fatehgarh Sahib

ABSTRACT:
The challenges of stiff competition and the drive for profits are forcing the organizations to implement various productivity improvement efforts to meet the challenges posed by ever-changing market demands. In today's highly dynamic and rapidly changing environment, the global competition among organizations has led to higher demands on the manufacturing organizations. The global marketplace has witnessed an increased pressure from customers and competitors in manufacturing as well as service sector. The reliable manufacturing equipment is regarded as the major contributor to the performance and profitability of manufacturing systems. Its importance is rather increasing in the growing advanced manufacturing technology application stages; therefore, equipment maintenance is an indispensable function in a manufacturing enterprise. More importantly, the rapid change in technologies and the market place requires the manufacturing sector to improve performance by emphasizing cost reduction, increasing quality and delivery levels, and improving equipment and human resources. Maintenance is a business function that serves and supports the primary process in an organization. It is defined as the combination of all technical and associated administrative actions intended to retain an item in, or restore it to, a state in which it can perform its required function. This paper tells us about the Total Productive Maintenance (TPM) being used in small and medium scale industries. The different prospects of the Total Productive Maintenance (TPM) are surveyed and graphed.

KEYWORDS: Productivity, Improvement, Total Productive Maintenance, Performance, Small and Medium Scale Industries.

INTRODUCTION:

TPM is a unique Japanese philosophy, which has been developed based on the Productive Maintenance concepts and methodologies. This concept was first introduced by M/s Nippon Denso Co. Ltd. of Japan, a supplier of M/s Toyota Motor Company, Japan in the year 1971. TPM is an innovative approach to maintenance that optimizes equipment effectiveness, eliminates breakdowns and promotes autonomous maintenance by operators through day-to-day activities involving total workforce (Bhadury, 2000).TPM is a production-driven improvement methodology that is designed to optimize equipment reliability and ensure efficient management of plant assets (Robinson and Ginder, 1995).Whereas maintenance departments are the traditional center of preventive maintenance programs, TPM seeks to involve workers from all departments and levels, including plant-floor operators to senior executives, to ensure effective equipment operation. Manufacturing is considered to be an important element in a firm's endeavour to improve firm performance (Hayes and Wheelwright, 1984; Skinner, 1982). Superior manufacturing performance leads to competitiveness (Leachman et al., 2005). TPM is a highly structured approach, which uses a number of tools and techniques to achieve highly effective plants and machinery. With competition in manufacturing

Industries rising relentlessly, TPM has proved to be the maintenance improvement philosophy preventing the failure of an organization (Eti et al., 2006).

LITERATURE REVIEW:

Total Productive Maintenance (TPM) is an expansion of the Lean enterprise culture. In today's highly competitive business environment, survival and growth of manufacturers depend on their ability to offer a great variety of high quality products at an acceptable price using minimum lead time. TPM Implementation can be helpful in paving the way for these objectives. The ultimate goal of TPM is to optimize the delivery time, service level and productivity to fulfill the customer needs and expectations. It has been acknowledged that the employees always play a key role in the success of any TPM project. With the help of proper employee training and adoption of strategies like autonomous preventive maintenance (PM), companies have successfully achieved improvement in increasing their equipment effectiveness and to reduce the machine breakdowns. The working environment is also much cleaner and safer than before. But most of all, there has been a significant improvement with worker and customer satisfaction. Today, an effective Total Productive Maintenance strategy and programs are needed, which can cope with the dynamic needs and discover the hidden but unused or under-utilized resources (human brainpower, man-hours, and machine-hours). TPM methodology has the potential to meet the current demands. A well-conceived TPM implementation program not only improves the equipment efficiency and effectiveness but also brings appreciable improvements in other areas of the manufacturing enterprise. A number of researchers and practitioners have evaluated the contributions of an effective TPM implementation program towards improving manufacturing performance. . The inter-relationships between various TPM implementation success factors with the manufacturing performance improvement parameters have been evaluated, to efficiently manage the TPM implementation program to realize organizational objectives of growth and sustainability.

RESEARCH METHODOLOGY:

The steps followed during the research work were-

1. Formulating the research problem through Literature review and overview of maintenance techniques.
2. Design of the maintenance questionnaire in order to evaluate the responses of various Indian manufacturing organizations towards maintenance implementation.
3. Further, the analysis of data received through questionnaires has been conducted to ascertain contribution of organizational dimensions towards performance indicators. The critical success factors for the maintenance practices have been evaluated along with the evaluation of inter-relationships between organizational dimensions and Manufacturing Performance Indicators.
4. Scope of the future research work and conclusions.

ANALYSIS:

Figure1. Reveals the extent to which productivity is increased by productive maintenance. The data reveals that in 38% (13 out of 34) organizations, productivity has increased to some extent, in 47% (16 out of 34) organizations, productivity has increased to large extent and in 15% (5 out of 34) organizations, productivity has increased to full extent by productive maintenance. So we conclude that in all of the organizations productivity has been increased by the use productive maintenance.

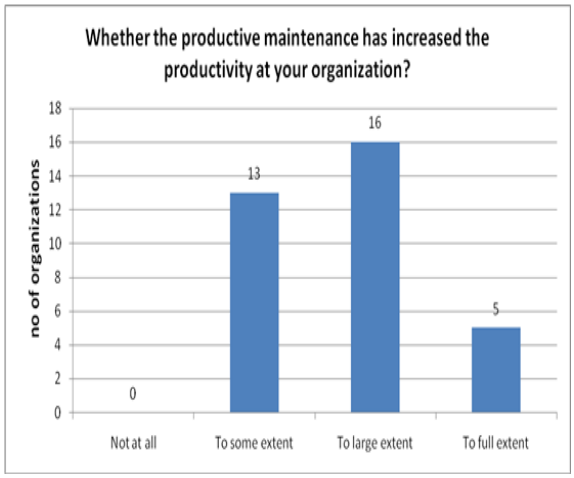

Figure1. Importance of productive maintenance in increasing the productivity

Figure 2.Graphically reveals the elimination of emergency and unscheduled maintenance in the organizations by the use of productive maintenance. The data reveals that in 41% (14 out of 34) organizations eliminated the emergency and unscheduled maintenance to some extent, while in 50% (17 out of 34) organizations eliminated the emergency and unscheduled maintenance to large extent and in 9% (3 out of 34) organizations eliminated the emergency and unscheduled maintenance to full extent. So we conclude that in every organization the emergency and unscheduled maintenance is eliminated by the use of productive maintenance.

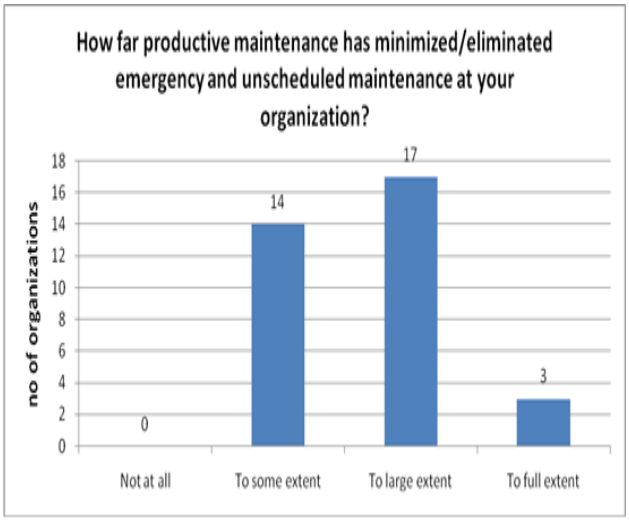

Figure2. Level of elimination of emergency and unscheduled maintenance

Figure 3.Predicts the current status of total productive maintenance (TPM) in the organizations. . The data reveals that 32% (11 out of 34) organizations are in early stages of TPM introduction are practiced, 15% (5 out of 34) organizations are approximately in midway in practicing TPM, 3% (1 out of 34) organizations are continuing TPM practices and 3% (1 out of 34) organizations have successfully completed the TPM implementation. So it is clear from data that some of the small and medium scale organizations under survey have started implementing the TPM technique.

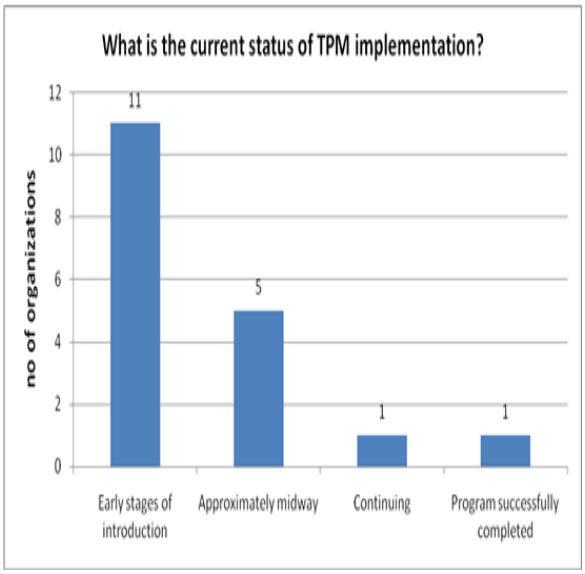

Figure3. Current status of TPM implementation

CONCLUSION:

The Maintenance improvement initiative toward enhancing manufacturing competencies of the organizations has been investigated by employing various statistical techniques in the research work. The study also highlighted that the strategic TPM initiatives can improve Overall Equipment Effectiveness and organizational flexibility thereby allowing organizations to compete effectively in dynamic environments. The study reveals that the productivity is always increased with the implementation of the Total Productive Maintenance in the industries and has also minimized the unscheduled maintenance in the organizations by the use of productive maintenance.The study also reveals that near aboutall the small and medium industries are in the early stages and midway of the the Total Productive Maintenance implementation.

REFERENCES:

1. Bhadury, B. (2000), "Management of productivity through TPM", Productivity, Vol. 41, No. 2, pp. 240–251.
2. Robinson, C.J. and Ginder, A.P. (1995), Implementing TPM: The North American Experience, Productivity Press Inc., Portland, OR, New York.
3. Hayes, R.H. and Wheelwright, S.C. (1984), "Matching process technology with product/market requirements", in Hayes, R.H. and Wheelwright, S.C. (Eds), Restoring Our Competitive Edge: Competing through Manufacturing, Wiley, New York, NY.
4. Leachman, C., Pegels, C.C. and Shin, S.K. (2005), "Manufacturing performance: evaluation and determinants", International Journal of Operations & Production Management, Vol. 25, No. 9, pp. 851–874.
5. Skinner, W. (1982), "Getting physical: new strategic leverage from operations", Journal of Business Strategy, Vol. 3, No. 4, pp. 74–79.
6. Chandra, P. and Sastry, T. (1998), "Competitiveness of Indian manufacturing: finding of the 1997 manufacturing futures survey", Vikalpa, Vol. 23, No. 3, pp. 15–25.
7. Garg, A. and Deshmukh, S.G. (2006), "Maintenance management: literature review and directions", Journal of Quality in Maintenance Engineering, Vol. 12, No. 3, pp. 205–238.