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Application of Lean Practices in Central India –A Case Study

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ABSTRACT

Industries located in central India are continuously facing cutthroat competition not only from the industries located in other region of the country but also from foreign industries. This condition also becomes more critical because industries based in central India are facing one more volatile issue that is low productivity levels. The concept of Lean manufacturing offers a good solution for increasing the overall productivity of the industry. Lean Manufacturing focuses on elimination of waste in any form by implementing the lean practices.

Keywords: Lean practices

I. INTRODUCTION

Womack and Jones define lean production as "doing more and more with less and less human effort, equipment and less space while coming closer and closer to providing customer with exactly what they want"[1].Lean manufacturing is the process of analyzing the flow of materials and information in an environment and continuously improving the process to delight the customer. Lean manufacturing applies the modern elements and technologies of different areas such as Process Improvement, Operational Improvement, World Class Manufacturing, and Just-In Time, Continuous Flow, Concurrent Engineering, Continuous Improvement, Kaizen, and Supply Chain Integration. The aim of this research is to determine the level of practical use of the lean practices in the industries located at central India industrial areas, for improvement.

II. RESEARCH OBJECTIVE

The main objective of this research paper is to identify the major lean practices which are being implemented throughout the world as well as in central India region. It also has an aim to establish the factor that which lean practice is being highly adopted by the industries and vice versa in central India base industries.

III. LITERATURE REVIEW

Literature regarding the implementation of lean practices in India as well as abroad has been reviewed by searching various electronic database and research journals. A table 1.1 is prepared by the author to show the important lean practices which has been identified as major lean practices by the various authors.

Table 1.1 Lean Practices

S.No	Lean Practices	Shah and Ward (2003)	Herman Palm (2006)	T.Bonavia et.al (2006)	Shah and Ward (2007)	T.D. Vermaak(2008)	G. B.Stump (2008)	S. Vinod et.al (2010)	M. Eswaramoorthi et.al (2010)	Rose A.M.N et.al (2011)	Yu Cheng Wong et.al (2011)	Bulent Sezen et.al (2011)	Ondiek et.al (2013)	Mohd Nizam Ab-Rahman et.al (2014)
1	Cellular Manufacturing	*	*		*			*	*	*	*	*		*
2	Single Minute Exchange of Dies	*	*	*	*	*	*		*	*	*	*		*
3	Pull System/Kanban	*	*		*	*	*	*	*	*	*	*	*	*
4	Small Lot Size	*	*						*	*	*	*		*
5	Line Balancing		*			*	*		*	*	*	*	*	*
6	Cycle Time Reduction	*	*						*			*		*
7	Value Stream Mapping		*			*		*	*		*	*	*	
8	Bottleneck Removal	*								*				
9	Standardised Work			*		*	*		*	*	*	*	*	
10	Supplier Involvement				*			*	*	*	*	*	*	
11	Customer Involvement						*						*	*
12	On-time Delivery		*					*				*		
13	5S			*			*	*	*	*	*	*	*	*
14	Visual Management & Control		*	*		*	*	*	*	*		*	*	*
15	Continual Improvement	*		*		*	*	*	*	*	*	*		*
16	Poka Yoke		*			*		*	*		*	*		*
17	Benchmarking	*												
18	Quality Circle	*		*					*	*				
19	Cross Functional Teams	*					*		*	*		*		*
20	Takt Time Production		*			*	*		*			*		
21	Multiskilled Employees			*					*					
22	Employee Involvement				*				*	*		*	*	*
23	Overall Equipment Effectiveness	*	*	*	*	*		*	*	*	*	*	*	*
24	Total Productive Maintenance	*	*	*	*	*		*	*	*	*	*	*	*
25	Safety Improvement Programs	*			*							*		

IV. RESEARCH METHODOLOGY

A survey based approach has been adopted in order to meet the above stated objectives. A research questionnaire has been prepared which is followed by pilot study, pretest, and validation. The final questionnaire has been sent to 250 industries located at central India region. Out of 250 industries only 128 has answered the satisfactorily. Data received from the industries has been tabulated and loaded in to the statistical software for the further analysis.

V. ANALYSIS

In order to gauge the level of practical use of the lean practices in central Indian industries the respondent companies were asked to rate the level of adoption on each of the lean practices listed on Likert scale from 1 to 5 (1 for never used, 2 for rarely used, 3 for partially used, 4 for frequently used and 5 for continuous used). Figure 1.1 illustrates the distribution of lean practice mean scores. Among all of the lean practices, safety improvement program is found to be the leading lean practice, with mean score 4.56. Other lean practices that have been extensively implemented is the total productive Maintenance (TPM), overall equipment effectiveness(OEE), multiskilled employees, employee involvement, cross functional teams, continuous improvement and 5S and these practices having a mean scores greater than 3.0. However, the least practiced lean tools are the Kanban, value stream mapping and many other lean practices up to cellular manufacturing and SMED as shown in figure 1.1 having mean score less than 2.0, showing low implementation in industries. Low application of these lean practices is also because of several factors such as practices like value stream mapping require lot of planning at each level, in depth knowledge of particular practice in order to implement it effectively among team members, uncertainty of demand from the customer of a particular product and not the least but most important is adequate arrangement of finance for making the proper arrangements for the effective application of the practice. On the contrary, a practice like 5S is the simplest and easy to use in industry instantly irrespective to the size, expertise, and others factors related with an industry. In field trips of industries by the researcher during this study it is found that, workforce in industries also familiar about the practices like safety improvement programs; use of personal protective equipment, resolving any problem in the cell through cross functional teams by basic practices. This pattern also reflects in the figure 1.1. Another lean practice which is widely and continuously used in the industries as endorsed by the collected data is TPM and OEE. It is clear from the figure 1.1 that industries particularly in central India region are adopting the Total productive maintenance and the concept of overall equipment effectiveness on fast track basis. One of the reason for rapid implementation of TPM and its associated practices is that in present scenario it is utmost important for the industries to keep equipment and machines as well as utilities services in operational mode(24* 7). Industries cannot afford to stop the production because of poor maintenance. In this way, it is clear that industries are embracing the simple and quick to implement practices rapidly such as 5S, Kaizen, total productive maintenance. Gradually companies are moving to the use of advanced lean practices such as value stream mapping and many others.

VI. RESULT & DISCUSSIONS

The sample industries have varied level of using the various lean practices. The level of practical use of lean practices in the sample industries is measured on 1 to 5 likert scale. As shown in figure 1.1, it has been resulted from this research study that among sample industries highest used lean practices are TPM (Total productive maintenance) based practices and 5S such as safety improvement programs with mean score 4.56, Total productive maintenance (TPM) and overall equipment effectiveness (OEE) with mean scores 4.51 and 4.47 respectively then followed by 5S. This trend shows that in sample industries application level of TPM based lean practices are quite high as compare to other lean practices. Obviously this indicates companies are highly inclined towards TPM based activities. On the other hand among sample industries lowest used lean practices are Kanban with mean score 1.13, value stream mapping with mean score 1.14, small lot size with mean score 1.17 and bottleneck removal with mean score 1.18. This trend shows that in sample industries application level of advance lean practices is comparatively

low. This is also justified by the fact these all low score lean practices requires an expertise as well as separate budget provision to implement effectively. This indicates that the sample industries can use these least used lean practices in order to become more productive. This reflects that industries could work more in this direction and acquire maturity by mastering the application / implementation of advance lean practices such as value stream mapping (VSM), to improve the overall performance. One more fact which is very clear from this discussion is that sample companies are using the lean practices in isolation or in separate component. Companies must understand that simultaneously application of several lean practices can improve their performance considerably instead of using lean practices in separate mode for example application of SMED practice involve many lean practices such as visual management,5S, cycle time reduction etc. This study also explains the combined effect of lean practices in the form of integrated model on the productivity.

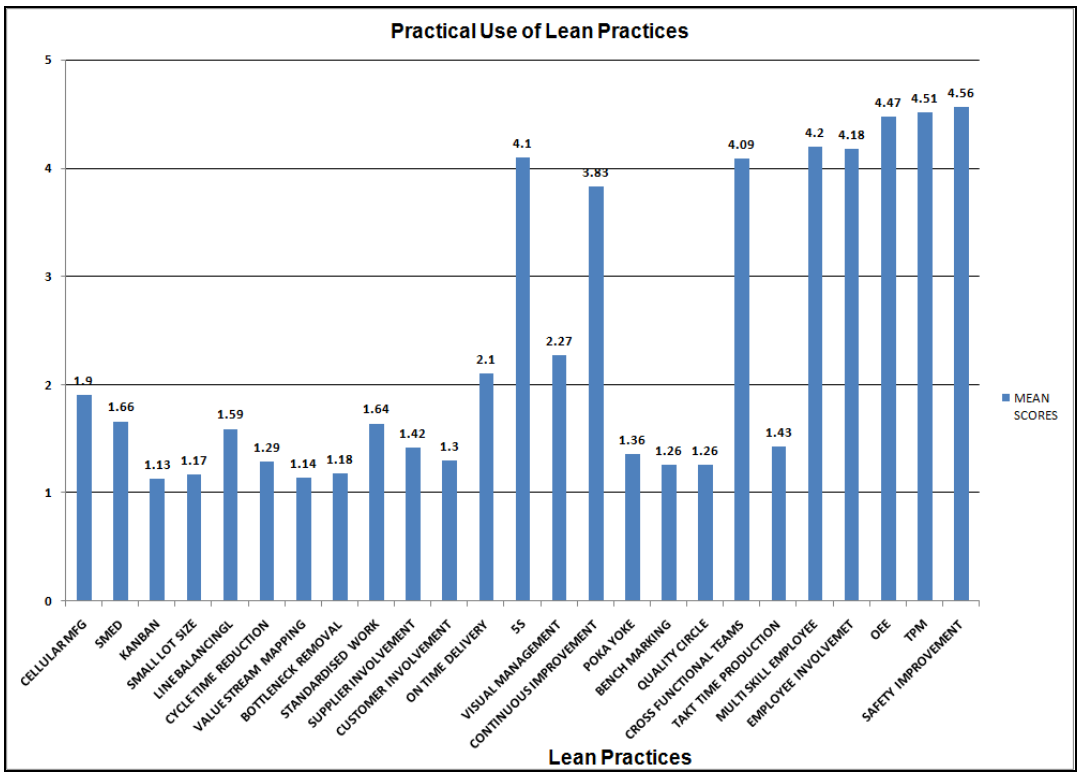

Figure 1.1: Practical use of the Lean practices

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