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Performance improvement through TPM implementation in Textile industry

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ABSTRACT:
The primary goal of TPM (Total Productive Maintenance) programme is to change the culture of the company's maintenance policy by involvement of all employees toward the maintenance system of the company. It aims to reduce unplanned stoppage, breakdowns accidents and losses obstructing equipment effectiveness. In most of Indian industries maintenance is considered as evil activity. Therefore by implementing TPM the industries can increase their equipment effectiveness and productivity. This paper is aimed at implementation of Total productive maintenance in Indian textile industries. The need for driving down costs, integrating every activities and available resources of a company, empowering the employee to make decision, eliminating waste generated by failure across the value adding process, shortening of production lead time and delivery of quality assured services and products have been given due attention. The work is organized in such a way that the results of the conducted study will be presented in comprehensible way
KEYWORDS: maintenance policy, unplanned stoppage, TPM, driving costs

INTRODUCTION:

Based on observed problems, the study mainly focuses on dealing with the way that the selected Textile industry enables to improve the existing maintenance system of the company to have better capacity utilization and to enhance the effectiveness of its equipments. Hence, the thesis will try to fulfill the following objectives.

Primary objective:

The scope of inventory management also concerns the fine lines between replenishment lead-time, carrying costs of inventory, asset management, inventory forecasting, inventory valuation, inventory visibility, future inventory price forecasting, physical inventory, available physical space for inventory, quality management, replenishment, returns and defective goods and demand forecasting.

Research Methodology:

This study has exploited various research methodologies by exploring their contribution toward the best triumph of the anticipated results. Relevant primary and secondary information was congregated to induce superior maintenance system for the industry. The relevant secondary data was collected from the technical manual, monthly and annual report of the industry. Information was also gathered using questionnaire and interview in structured way besides direct observation on site visit to enable the investigator to keep tracking the responses.

TPM Process:

At a pace to be chosen according to the particular conditions, the implementation process will go, at least, through 60% of the most important machines at the most critical areas or departments. Also "spontaneous implementation" is expected in some areas. For those, the TPM coordination will supply all the technical support required.

The general foremen and other key people of each shop department or production area will reach a decision about what is the next machine and what the most feasible schedule. They will also assign the people to the team for that particular project. Teams are normally comprised of four to eight people. Machine operators have a very important participation in this process. They will lead the team to solve the most important concerns that they have in the day to day dealing with the machine. They know how the machine could be improved to become safer and more comfortable to work with. They become customers and co-providers of the TPM effort. By participating, they develop "ownership" on their machines.

Overall Equipment Efficiency (OEE):

OEE is a tool that combines multiple manufacturing issues and data points to provide information about the process. It is an all inclusive benchmarking tool that serves to gauge the various subcomponents of the manufacturing process (i.e., availability, performance and quality)—and used to measure actual improvements on 5S, Lean Manufacturing, TPM, Kaizen and Six Sigma. When using OEE with these management systems the benefits become tangible and noteworthy

OEE = Availability Ratio x Performance Ratio x Quality Ratio

CASE STUDY: Selected Textile Industry

Selected Textile Industry Private Limited Company was established over twenty years ago, a pioneer in the private sector of Textile Industry of India. Due to confidentiality matter the exact name and layout has not been mentioned. From its humble beginnings with only few employees, Selected Textile Industry has grown into one of the major players in the industrial sector of the country.

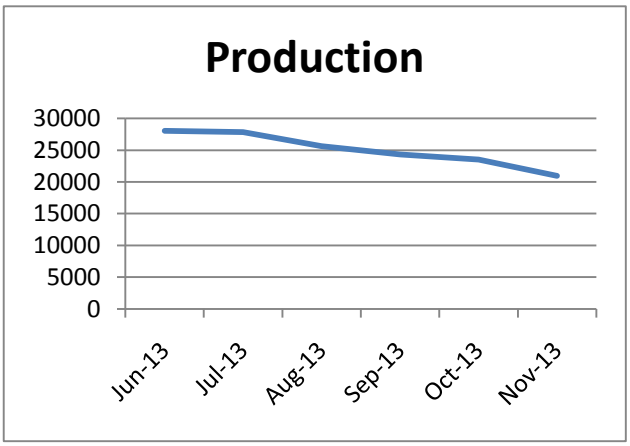

Fig 1: production for six months

As it can be analyzed from the fig1 which shows the monthly production of blanket the production of the factory is about to decrease as indicated. This is caused by different problems of the company. One of the problems assessed is the unplanned stoppages of the machineries caused by the shortage of spare parts. When we think of production we have to think the health of the machineries first. Otherwise the unplanned stoppage is expecting situation.

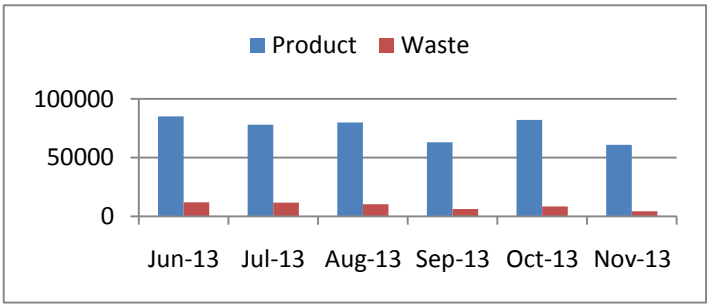

Fig 2: Waste and production report of the six months

The other situation analyzed from the data collected is the amount of waste. In this case it is difficult to analyze the amount of waste in Kg with the previous month waste, because it is proportional to the amount of product. Therefore the researcher realized the percentage of waste.

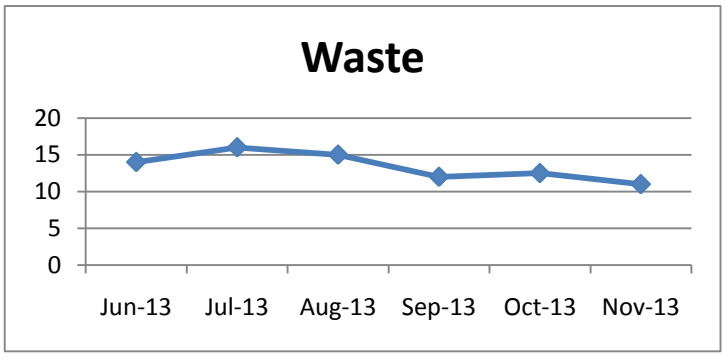

Fig 2: Shows the percentage waste of the six months

From the Fig 2 We can analyze that the wastage is not in increasing rate. This is not to show that the company should be satisfied by the result but still it has to perform much to decrease the amount of waste scientifically.

Types of defects:

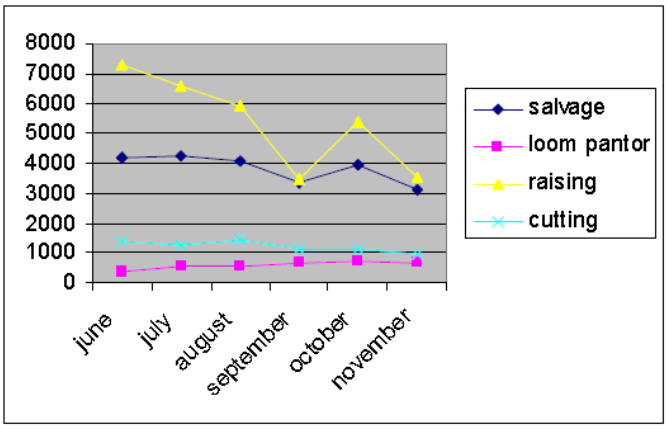

Fig 3: Shows the comparative analysis of the types of defect in blanket factory

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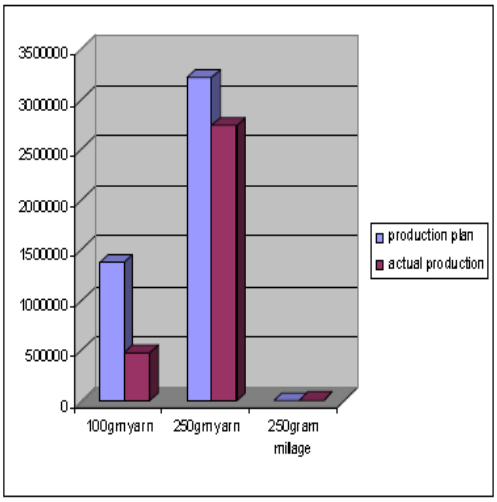
Data analysis of acrylic yarn factory:



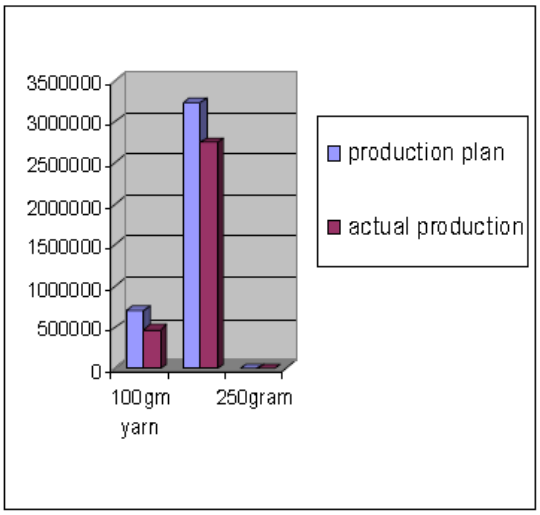


Fig4: The annual production plan and actual production of acrylic yarn factory in three years.

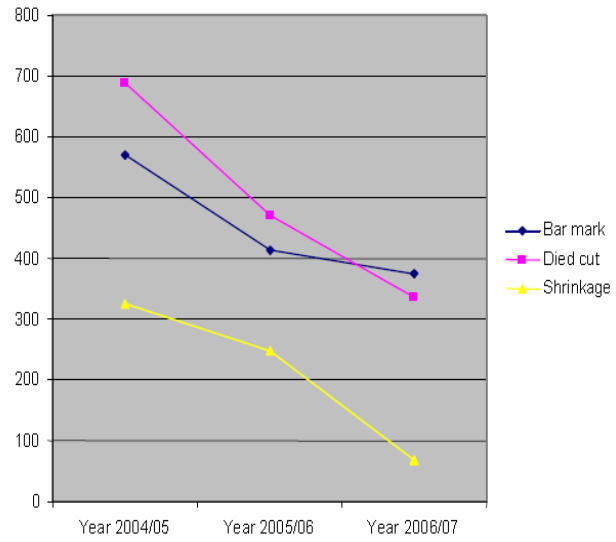


Fig 5 The type and amount of defects in three years

Software development:

The application soft ware is developed by combining Visual basic and the Microsoft access. By reviewing different literature the assessment questions are prepared and divided in to six levels. The distribution is mainly based on the steps in each pillar development. There are eight pillars in TPM development which should be implemented side by side. The entire programme is assessed in each six months interval. The assessment will be done according to the software and the company which does not performed well in that level will repeat the level and another six months will be given to improve the pillars on which the company performed badly. And after the sixth level the company will be awarded and should perform for the higher level of TPM.

Application Soft ware Guide:

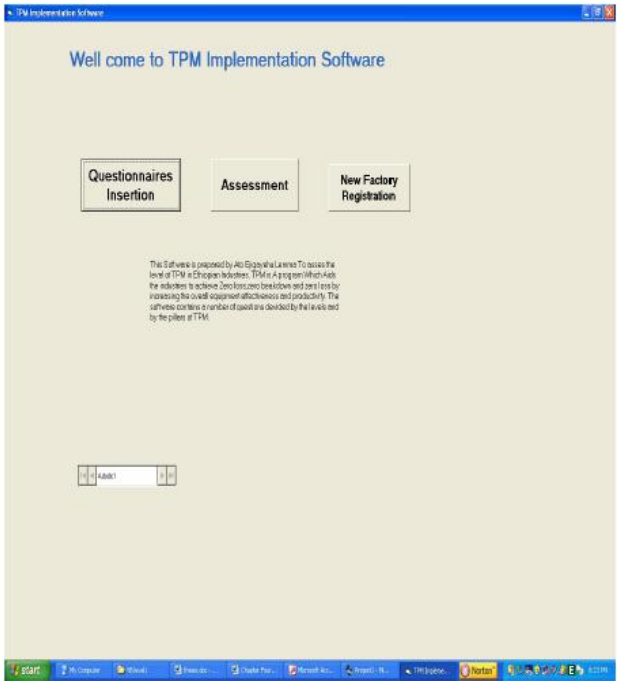


Fig 6 Visual basic Form 1

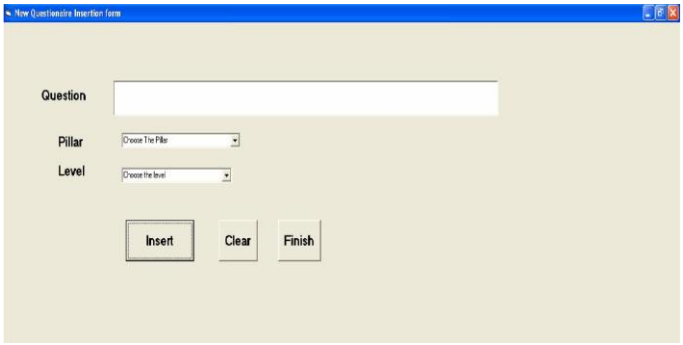


Fig 7 Visual basic Form 3

The Third form as shown in the Fig.7 contains questionnaires insertion. In this form we can add any other questions in the database. The questions are inserted according to their respective pillars and levels are automatically added to the data base tables and stored. During assessment these questions are accessed and evaluated by the software.

The fourth form as shown in the fig 8 below contains the pillar selection button, level selection button and factory selection buttons. After the selection of the above buttons the record button automatically records the questions to the form. The evaluation should take place by the experts and finally the value is recorded. The option buttons allow the evaluator to give the values from 15. If

the factory has performed excellent by the indicated question the value 5 will be given and if it performed badly it will be given1.

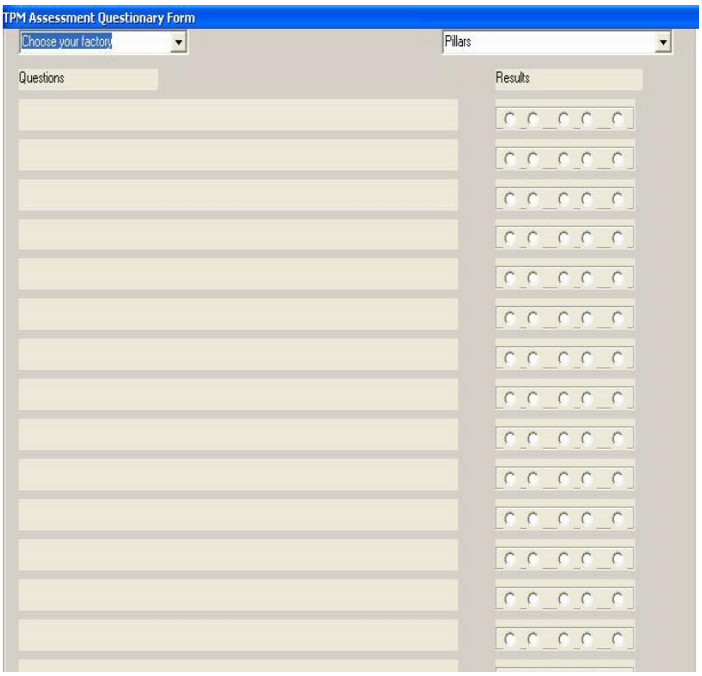


Fig 8 : TPM assessment form4

The last form of the visual basic shows the details of each pillar. After the last pillar of the level has been evaluated the summery command will be clicked and it will show the overall percentage of the score and after that if the user wants to view the details of the score in each level it will display the average out of five for each pillar.

Fig 9: Detailed summery Form5

Results and Discussions:
Some of the problems observed during the study are listed as follows:

1. The company doesn't have any maintenance record and during the study it was difficult to get data of each machine. Even the maintenance operation is performed after the breakdown of the machineries. In TPM concept the machineries should have their, own history and records; This aids the company to perform the maintenance operation smoothly.
2. The above problems lead the company even to spend more money for maintenance and also high down time. Unplanned stoppages are also high and many machines are stopped by the shortage of the spare parts.
3. From the observations and interviews there is luck of good management system and the workers of the company compare their payment with the other similar companies in that area. This causes the workers to become highly dissatisfied. The operators of the machine are not interested to handle the machines with care.
4. The results found from the waste report of the acrylic yarn factory indicate that most of the defects are caused by the negligence of the workers and their carelessness.

Conclusions And Recommendations:
The study aims initially at scrutinizing the maintenance system of the industry and categorically concluded that the high rate of unplanned failure reigns in the Industry. This can be attributed to the condition of equipment, due to negligence of the operator and shortage of spare parts. The underprivileged preventive maintenance system of the industry is also contributed to this effect. The line of investigation winds up that the effect of not involving the operator in minor inspection and restoration of equipment escalates unexpected number of failures which challenges to maintain the proactive maintenance programme.
The study also develops the implementation of total productive maintenance system to preserve the results of the above model since the central core of the Total Productive Maintenance system is to integrate every activities of a company with maintenance department as well as involving the operators in maintenance activities. The proposed implementation process executed devising the implementation steps systematically by breaking

down each activities of the pillars of TPM and leveling them according to their priority.

Recommendations:

1. Maintenance activity shouldn't be considered any more as a separate and isolated function that makes repairs which is evil activities and that leads to high expense. Rather, it should be considered as the main potential area to use as a competitive advantage. Otherwise, higher cost will be incurred after the equipments deteriorate which directly affects the competitiveness of a company.

2. The companies should involve achieving the company goal through the implementation of operator initiated daily maintenance consisting of cleaning, adjustment, and regular inspections, as well as improvement activities and minor restoration of equipment. And the maintenance men should only participate in inspection and restoration of equipment which requires high skill and specialization

3. The industries should implement the Overall Equipment Effectiveness as a performance indicator to track the efficiency of equipment in order to achieve higher target.

REFERENCES

1. John S.Oakland, Total Quality Management, Second edition, 1993.
2. Anthony M. Smith, Maintainability, Reliability centered maintenance, McGrawHill New York, 1993.
3. Japan Institute of Plant Maintenance (JIPM), TPM Implementation Documents, JIPM Solution.
4. Robinson, C.J. and Ginder, A.P., Implementing TPM: The North American Experience, Productivity Press, Portland, OR, 1995
5. Moubray, John, Reliability Centered Maintenance, Butterworth Heinemann Ltd., Boston, 1997.
6. Nakajima, S., Introduction to Total Productive Maintenance, Productivity Press, Cambridge, MA, 1988.
7. Venkatesh J, an Introduction to Total Productive Maintenance (TPM), Copyright 19962005, The Plant Maintenance Resource Center
8. Wireman, Terry, Computerized Maintenance Management Systems, 2 nd ed., Industrial Press, New York, 1994.
9. Preventive Maintenance http://www.weibull.com/SystemRelWeb/preventive_maintenance.htm
10. Equipment Maintenance Strategies, Preventive, Predictive Maintenance and Reliability Centered Maintenance (RCM).

http://www.plantmaintenance.com/maintenance_articles_rcm.shtml
11. Tsuchiya, Seiji, Quality Maintenance: Zero Defects through Equipment Management, Productivity Press, Portland, Oregon, Cambridge, Massachusetts, 1992.
12. Ho S.K.M., TQM: An Integrated Approach Implementing TQ through Japanese 5S and ISO 9000, Kogan Page, UK, 1999
13. Masaji Tajiri, Fumio Gotoh, TPM Implementation: A Japanese Approach, McGrawHill, Inc., New York, 1992.
14. Johansson B., Nord C, TPM – one way to increased competitiveness. Examples from a medium – sized company, Swedish, 1999.