Reduction of downtime of CCL-1 by implementation of TPM (Frugal)

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Abstract: The manufacturing industry has gone through significant changes in the last decade. Competition has increased dramatically. The global competition is based on the innovation of advanced products, processes and technology support is the essential. The aim of this paper is to achieving operation excellence by implementing the Total Productive Maintenance (TPM). In this paper, we have taken the case study to demonstrate the TPM implementation methodology and to highlight the benefits achieved during TPM in an engineering industry ESPF ,Pune. TPM proved that its implementation helped the company significantly to achieve higher productivity, customer satisfaction, safety, morale and profits. Based on the analysis for achieving operational excellence 5S, preventive maintenance and Kaizen are important.

Keywords: Total productive maintenance, Productivity improvement, Continuous improvement, Preventive Maintenance and reliability.

I. INTRODUCTION

TPM focus on improvement in equipment availability, performance and quality with assuring health and safety of employees and protection of environment. TPM helps for eliminating equipment breakdown and improving quality performance of equipment, thus the achievement in TPM strongly supports in attaining the lean concepts which includes the elimination of waiting time, defects in process etc. TPM is a program that addresses equipment maintenance through a comprehensive productive maintenance delivery system covering the entire life of the equipment and involving all employees from production and maintenance personnel to top management. It is intended to "bring both functions (production and maintenance) together by a combination of good working practices, team working, and continuous.

TPM is characterized by 5 key elements:

TPM aims to maximize equipment effectiveness.
TPM establishes a thorough system of Preventive Maintenance (PM) for the equipment's entire life span.
TPM is cross-functional, implemented by various departments (engineering, operators, maintenance, managers).
TPM involves every single employee.
TPM is based on the promotion of Preventive

- it can be considered as the medical science of machines.
- total productive maintenance (tpm) is a maintenance program, which involves a newly defined concept for maintaining plants and equipment.
- the goal of the tpm program is to markedly increase production

TPM was introduced to achieve the following objectives. the important ones are listed below.

- avoid wastage in a quickly changing economic environment.
- producing goods without reducing product quality.
- reduce cost.
- produce a low batch quantity at the earliest possible time.
- goods send to the customers must be non-defective.

Maintenance through the motivation of management
After analysing the existing conditions ESPF set the goals that were result oriented, specific, measurable, attainable and realistic. For this ESPF established TPM policies, objectives, targets, organizational structure as well as all necessary procedures so that the set goals should be very much clear to everyone involved in TPM implementation.

II. Problem Statement

Time is money, shorter lead time or throughput time is always good thing for producer or customer. The production timing effort of each planning step that gives information about the starting and ending dates, which are necessary for an exact scheduling of the whole production process. The research work in production plant, analyzing the production data, trying to find out where the problem it is. There are some reason we found by analysing previous year data-

- The "Up Time" of Plant was much lower than desired. UP time is line availability time, for production.
- Increase "UP time" by 20%.
- line operating efficiency was low.

III. AIM and Objective

The aim of this paper is to achieving operation excellence by implementing the TPM (Total Productive Maintenance). The management has decided to implement a TPM (Total Productive Maintenance) approach, but the main focus has been on achieving Operational efficiency through improvement activities which are aimed at:

- Deleting non-added value activities (5S)
- Continual Improvement (KAIZEN)
- Improve Safety (EHS)

IV. Methodology (DMAIC)

DEFINE

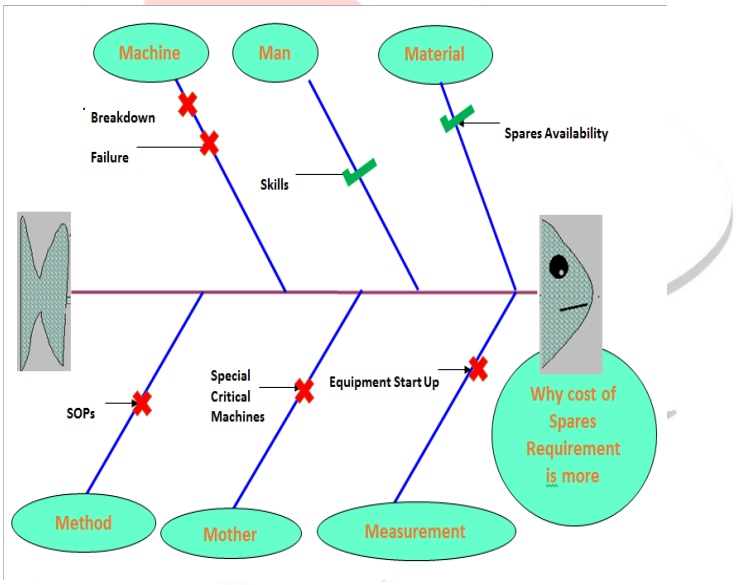
To reduce downtime of Color coating line (CCL) time by utilising spare availiblity.

MEASURE

Checked the consumption pattern of the material used in CCL-1
Checked the high value material items.
Checked the critical material availability

ANALYSE (FISHBONE of 6 M's)

Machine – In Case of breakdown the person has to replace the spares available & start the machine.
Method – SOPs (Standard operating Processes) are there to replace the spares.
Man – The replacement of spares skills are required for the man working on it. The man must have Skills to repair the faulty spares
Mother Nature – There are some critical machines which required critical spares.
Material – Availability of spares is required.
Measurement – After replacement of spares the start up of the machine is required.



IMPROVE

To remove non-value-added activities (5S)

5S practice is a well-recognized key to quality and productivity and for improving the work environment, so it becomes the starting point of TPM programmed. The 5S practice is a technique used to establish and improve work environment and total quality thus it becomes a base for continuous improvement in the organizations. 5S stands for five Japanese words: Seiri, Seiton, Seiso, Seiketsu and Shitsuke . They mean organization, neatness, cleaning, and standardization and discipline respectively

Continual Improvement (KAIZEN)

Kaizen is a Japanese word meaning continuous improvement. It's made up of two characters in Japanese: kai, which means 'change,' and zen, which means 'good.' It's used to describe a company culture where everyone, from the CEO to the front desk clerk, regularly evaluates his or her work and thinks of ways to improve it. The concept is that small steps on a regular basis will lead to large improvements over time.

KAIZEN's Implemented

- Reshuffling of the cards and assembling of the parts done.
- Total 20 items repaired and made Usable as spares.
- Spares for obsolete items were made ready by providing tags for the working units
- Contribution was done from each and every team member.

Methodology

- **Step 1 – Find Improvement area**
- **Step 2 – Prepare a Team**
- **Step 3 – Examine present status**
- **Step 4 – Examine Improve status**
- **Step 5 – Evaluate KAIZEN**
- **Step 6 – Reward best KAIZEN**

CONTROL

- Training given to all the technicians working in the department.
- Principal used for improvement is PDCA
- Regularly monitoring the downtime and spares.

V. RESULTS

- Reduction in down time.(485 min to 90Min) increased UP time by 22%.

Month	Electrical (In Mins)
APR	485
MAY	385
JUNE	225
July	160
AUG	205
Sept	160
OCT	171
NOV	113
DEC	90
Total	**1994**

- Reduction in cost of operation (32Lakhs Saving)

Sr. No.	Summary of Recovery	Cost Recovered in Lacs
1	Repair of Electrical Items	1.4
2	Repair of DC Drives Cards	25.9
3	Repair of PLC & Automation Cards	3.2
4	Recycling of Material	1.7
Total Amount Saved in Lacs		32.2

- Better work place (cleaned).
- Improved safety of workmen.
- Training given to workmen.

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