Managing Operations to Obtain OEE Target through SAP Data by Reducing Machine Downtime

[1]Shabaz Ahmed, [1] Srinivas Prasad K ,[1]Vinith B N, [1] Yogesh N ,[2] Venkatesh B K

[1]UG scholars, School of Mechanical Engineering, REVA University, Bengaluru, India
[2]Assistant Professor, School of Mechanical Engineering, REVA University, Bengaluru, India

ABSTRACT: The purpose of this paper is to present a sample of how manufacturing companies deal with equipment downtime cost, and further how they analyze its reduction. The study was performed by conducting a survey within Company that has at least 200 employees. Manufacturing strives to reduce waste and increase Overall Equipment Effectiveness (OEE). When managing machine maintenance, a manufacturer must apply an appropriate decision technique in order to reveal hidden costs associated with production losses, reduce equipment downtime competently and similarly identify the machines' performance. OEE is a powerful metric of manufacturing performance incorporating measures of the utilization, yield and efficiency of a given process, machine or manufacturing line. The Study estimates the total downtime of machine and causes of the machine downtime. The simple mechanism has adopted to reduce the loading and unloading time, by this mechanism the downtime has reduced partially. In addition, the OEE get improves.

INDEX TERMS:- OEE, Downtime, Breakdown, Performance, Manufacturing line.

1 INTRODUCTION

The Development in recent decades towards a global economy and the last global economic recession has intensified the need for manufacturing companies to improve their competitiveness. In order to retain and improve the ability to compete in the market, productivity optimization has become a central issue, which can be achieved by detection and elimination of machine downtime. In such a context, process measurement and evaluation play an important role in understanding the current operational performance and in recognizing possibilities for improvement.

Overall Equipment Effectiveness (OEE) is a tool for monitoring how manufacturing resources' time is allocated and identifying those margins available for improvement. Specifically, OEE is computed from an initial operational environment and subsequently monitored at regular time intervals, in order to evaluate the existence and effectiveness of upgrades, implemented and consolidated year by year, as suggested by the Total Quality Management (TQM) approach. Furthermore, OEE is particularly useful when the production of new items is carried out using existing resources and whose operating conditions are preferably modified as little as possible. As described in changing the operating conditions of manufacturing resources incurs costs, related to: acquisition of deficient knowledge, execution of new working procedures, execution of new maintenance operations and setting of new workstations. Hence, OEE is a tool for evaluating the future performance of manufacturing resources and comparing them with the initial situation by considering alternative operational scenarios. Specifically, those processes with high standards of quality are addressed.

Downtime or outage duration refers to a period of time that a system fails to provide or perform its primary function. Reliability, availability, recovery, and unavailability are related concepts.

Unplanned production stoppages and rate loss can have an enormous impact on the productivity and profitability of process plants. DTA (Down Time Analysis) systems provide easy to understand and comprehensive Key Performance Indicators (KPIs) which show the causes, duration and timing of **downtime**.

2 TYPES OF BREAKDOWN

2.1 Machine Breakdown

Breakdown generally refers to unforeseen and sudden physical damage to machinery from any cost not excluded which requires repair or replacement to enable normal working to continue.

2.2 No Continuous loading

There will be no work parts for the operations. If there are no work pieces the machine will be in the idle position. This leads to Cause of machine downtime.

2.2 Insert, Index, Tool setting

While the machining process, due to more speed and feed there is a chance of blend of cutting tool, this leads to reject in the work part.

2.4 Inspection Delay

In the machining process when the excess material removed from the work piece there will be the allocation of a greater number of the chips in the work area. Due to the excess formation of the chips there will be a problem for the further process. Chips should be taken out from the machine. This leads to the machine downtime

2.5 Chips Removal

Inspecting of work products after finishing the process by using the suitable instruments leads to delay the process time of the machine. For each work process the inspection was carried out

2.6 Fixtures

It is a work holding devices are used to hold or support the work piece. In fixtures the clamping of the work piece done manually it results in increases in the down time

3 METHODOLOGY

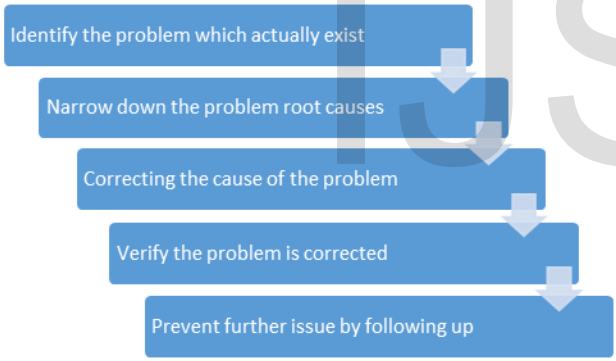

Fig.1 Methodology

3.1 Identifying the need

It is the first phase, the identifying the need arises from the problem in exiting product and it can be identified by an engineer. It involves the measure steps need to be taken to down the time and existing problem by some corrective action r by some technics which OEE can be increased

3.2 Select the possible wants to reduce down time

After the realization of the need the possible ways can be taken

- ❖ While unloading and loading time
- ❖ By using appropriate technics an strategies
- ❖ By scheduling the maintenance regularly
- ❖ By increasing and improving staff evaluation
- ❖ By holding regular staff evaluation
- ❖ By setting specific manufacturing plant goals
- ❖ By upgrading manufacturing equipment's

3.3 Analysis of down time

It is a very essential process of the plant operation management and it provides a powerful tool, which enables a better understanding of underlying issue, that effect plant availability and the rate loss? By analysis the down time we can implement on the product

3.4. Data collection

Data collection is the process of gathering and measuring information on Targeted variables. Since the collection of down time data represents heavy investment in both time and cost, it is an important to recapture the investment and the benefits of using valid and credible simulation model and technique of down time data collection

3.5. Implementation

It is a process of putting a decision or plan in to affect r execution, which strategies and plan into action in order to accomplish the objectives and goals

3.6. Outcome

The outcome is the final result of something the way end up. A conclusion reaches through a process of logical an we can found that the down time is being reduced by using appropriate technics an strategies which can be implemented an can get proper outime which is very effective an OEE can be increased

4 OBJECTIVES

1. To achieve high return on investment
2. To optimize utilization of resources (human, machinery, financial) with the needs of the organization in order to achieve established goals.
3. To improve the productivity of the manufacturing firm, reduce the downtime.

5 EXPERIMENTAL WORK

5.1 Typical Data Collection during Downtime

- Start Time.
- End Time.
- Operator name.
- Lot ID's or Product Serial Numbers.
- Machine Component ID's.
- Key Control Variables (Cycle counts).
- Reason Count for Downtime Reasons.

These Variables are collected in order to improve the machine utilization (Reducing Downtime).

5.2 Observation

Machines are placed next to next in a row following the cell concept and a single operator operates it. Operator used to carry parts from one machine to another machine manually. The following observations in terms of cycle time and loading/unloading time noticed

Simple mechanism for moving the parts from one machine to another machine is used to reduce the loading/unloading and as well as operator fatigue. By using this mechanism, the downtime has been reduced. This mechanism carries the machinable part from one machine to another machine. At a time, it can carry 2 parts of medium size and larger size of 1 part as shown in figure 1.

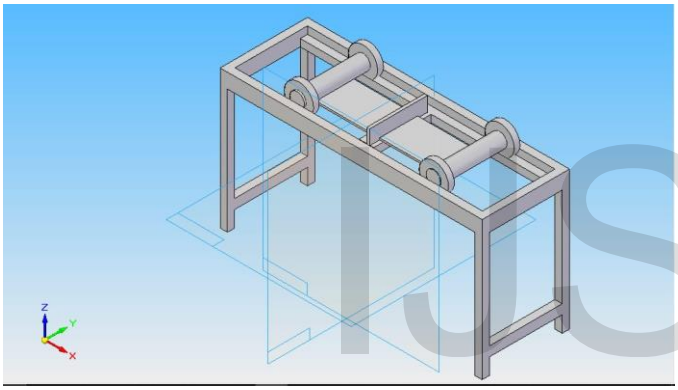

Fig. 2 Sliding Mechanism

The process is not fully automated the total available working hour is 22.5 hours per day and will be running 3 shifts per day and the company tries to utilize the complete working hours .Before the implementation of the mechanism the loading and the unloading time for each part on an average would be 1 minute to 1.5 minute as three machine is operated by a single operator in the first two machine the first side operation is done who's cycle time is 15 to 15.5 minutes and the second operation is done on the second machine who's cycle time is 7 minutes the operator was given 1 to 1.5 minutes for loading and unloading the parts. By using this simple mechanism the operator's work is made easy which eliminates the risk of carrying the work piece from one machine to another machine this also saves the time as well as reduce the fatigue for the operator and the cycle time also will be reduced by using this mechanism.

TABLE 1 MACHINING TIME BEFORE IMPLEMENTATION

Number of Parts	1	2	3	4	5
Loading and unloadi	1.5	1.45	1.47	1.5	1.48
M/C time in (Min)	14	14	14	14	14
Total Cycle (Min)	15.5	15.45	15.47	15.5	15.48

1. The parts produced per shift on machine 1 and 2 = 60parts
2. The parts produced per shift on machine 3 =60 parts
3. The parts produced per day = 180 parts

TABLE 2 MACHINING TIME AFTER IMPLEMENTATION

Number of Parts	1	2	3	4	5
Loading and unloading in (Min)	1	1.1	1.1	0.9	1
M/C time in (Min)	14	14	14	14	14
Total Cycle in (Min)	15	15.1	15.1	14.9	15

1. The parts produced per shift on machine 1 and 2 = 64parts
2. The parts produced per shift on machine 3 =64
3. The parts produced per day= 192 parts

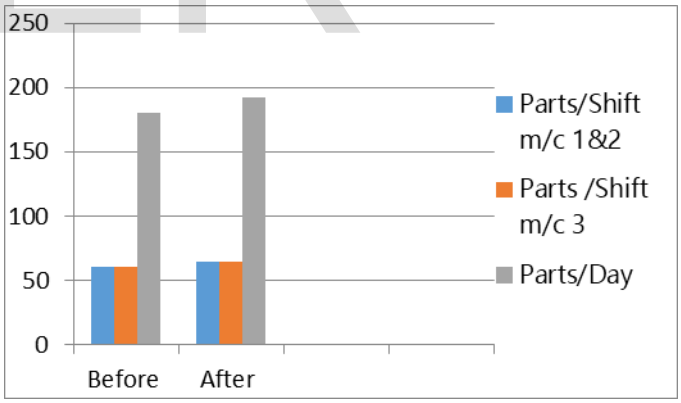

Fig.3 Before implementation and after implementation

6 CONCLUSIONS

Based on the study of OEE Target through SAP Data by Reducing Machine Downtime, the following conclusions are made:

1. By using this mechanism, the loading and the unloading time get reduced.
2. The productivity of the machine will increase and there the OEE will increase with the increase of the productivity.

3. The operator fatigue will also reduce the operator will work more efficiently.

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