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An Assessment over Preventive Maintenance and Breakdown Reduction of Critical Machine

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Abstract: *In response to the strong competition in the processing industry, the company invested in a highly automated production system with an excellent team. In order for the company to maintain its position in the global market, the full use of equipment is essential to maintain production activities, so it can achieve economic sustainability and maximize business benefits. If an unexpected shutdown occurs due to a hardware or device failure, production operations will be interrupted. Reviewing a production plan in an emergency situation can be very expensive and can also lead to a reduction in the quality and variability of the product at the service level. This is why maintenance systems play a key role in ensuring that the entire system works efficiently and effectively. Maintenance is one of the most important features in a production environment because it is more likely to support the performance of the equipment and increase the efficiency of the factory within the factory. Although maintenance is a worthless process in the industry, it cannot be denied that maintenance plays an important role in asset management. Maintenance is mainly used in the industry because it provides corporate profits in terms of customer satisfaction.*

Keywords: *Machine maintenance, Productive Maintenance, Performance Measures, Metrics And Indicators.*

1. INTRODUCTION

Machine maintenance is o importance in industry owing to the need to increase reliability and to diminution the possibility of production loss due to machine breakdown. The system's structural system reduces the daily deterioration and improves the quality of the equipment.[1]Maintenance is to ensure the correct and reliable way of using the equipment. Make sure the tool is targeted. Industry has very strict requirements to reduce the recession and become critical, and design systems should include safeguards. Dew (1991) and Sproull (2001) pointed out that it is very important to identify and eliminate the cause of any problems. The complete study identifies the integration process using a system designed with a clear strategy[2].

Focus on identifying and solving problems. Tools help organizations and people find rich and advanced search tools that are used to understand the development and implementation of calculation calculations for accounting calculation data1 The author's research and in-depth mathematical analysis largely documented different methods of modeling and maintenance. Many researchers have developed models to continuously focus for identifying and resolving problems. In the latter case, it is assumed that the system will only grow older or make it older during its use. This project involves identifying key machines in a deteriorating systems on production, quality, environmental and safety standards.[2]

Solve Critical Machine with Longest Downtime and Highest Failure Rate This project uses methods for preventive maintenance and error reduction to improve machine performance. An analysis of the main reason proved to be the main reason for the error, and some opportunities for simultaneous improvement were also found to reduce downtime.

Some points have been added to the list of preventive maintenance[4]. After the reduction of errors and preventive maintenance methods, availability has risen enormously. The main purpose of this project is to minimize downtime and maximize machine availability. Due to many factors such as

technology, standardization and quality, the processing industry faces greater competition in the market. This led to the company endeavouring to continuously improve and improve the company's quality and productivity[5]. One of the ways to increase productivity is to increase the availability of existing machines. The more machines are available, the greater is the margin for improving productivity and ensuring that other functional aspects of management are ensured. Total Productive Maintenance (TPM) is designed to increase the availability of existing equipment. TPM can be divided according to the overall efficiency of the equipment (OEE). The availability of the machine can be increased by shortening the downtime or downtime of the machine[6]. The main purpose is to reduce these problems by identifying the main problems that caused loss ofproduction of the company and achieving and implementing measures to improve machine performance. In this project, preventive maintenance and error reduction methods were used to improve machine performance. An analysis of the main reason proved to be the main reason for the error, and some opportunities for simultaneous improvement were also found to reduce downtime. For this reason, the project aims at minimizing downtime, maximizing accessibility, minimizing maintenance costs and achieving benefits that maximize project conclusions, which will help the maintenance department to increase the availability of equipment. Finally suggestion was given future work.

Maintenance is a general duty for the maintenance of equipment or machinery or equipment in normal working conditions, as it does not worsen its useful life and has no deficiencies in its functionality.

Any activity designed to maintain or retain operational resources for a good work environment. An important vehicle or machine to increase the product's value. Therefore, the machine should be in good condition. If the machine is not part of the assembly line, the production time may be very long. Improper device failure can cause quality problems. It would be great if the equipment or machine were always in working condition[8]. Therefore, minimizing overall service costs requires a single approach. Sometimes the machine is outdated for some time. If the organization or company wants to keep the competitive edge, review existing (old) cars and review maintenance and maintenance costs.[4]

Technical equipment and equipment are essential in good working conditions to achieve technical quality, reliability and productivity. Repair activities help protect and improve the performance of hardware and equipment and help incomes Reduce operational costs and increase productivityIf the equipment is manufactured, manufactured and installed, the repair team must be in the current position. The idea of restoring the child's age was presented as an early device. Ten years ago, it was replaced or dropped after the appliance or machine was used.

In order to improvements in automation and security, storage managers have developed the necessary technology for various management technologies, and advanced equipments should be well protected during their lifetime.

2. RELATED WORK

A. Performance Measures, Metrics And Indicators

"Performance goals" can be defined as measures to quantify the effectiveness and/or effectiveness of past or future activities has advocated the effective utilization of Performance Measurement Systems as a critical factor in the road of a generally based performance events (Neely et al 2002). The characteristics of performance indicators include relevance, explanatoryness, timeliness, reliability and effectiveness (Al-Turki and Duffuaa 2003). Performance measurement provides an important feedback link in the process of strategic change. However, because the measurement system provides incorrect or incomplete information, the learning process is often hindered. This is because the system used ignores the existence of different value systems within the organization. Traditionally, performance measures are mainly based on accounting accounting systems. This allows most of the measures to focus on financial data (such as return on investment, sales margins, price differences, sales per employee, productivity, and profit per unit of production). Of these enactment measures, where as a ‘performance metric’ is the definition of the scope, content and component parts productivity has been measured the main indicator of performance (Mathur et al 2011).

Equipment Device failure has been the cause of machine downtime. Industrial engineers have been trying to reduce downtime and increase machine availability. TPM plays a key role in achieving this goal.

Wakjira, MelesseWorkneh. And others. (2012) By implementing TPM at a boiler plant at the malt plant in Ethiopia, it is possible to reduce downtime and increase the OEE of existing machines. By TPM, Gupta, Amit Kumar. And others. (2012) played an important role in improving the availability of existing machines, reducing the need for increased capital investment. The fourth pillar of the TPM - regular maintenance solves equipment failures. Preventive technologies related to programmatic maintenance. M, Manoj. The establishment of preventive maintenance lists (2014) significantly reduced availability, MTBF and MTTR. In this case, the number of machine downtimes will also

decrease after implementation. Parameters such as reliability, MTTR, and MTBF are also important factors in decomposing the equipment, helping to better understand the equipment. In order to measure the reliability of a device, it is important to determine the cumulative distribution function (CDF) that determines the error range. Mirzai, M. Et al. (2006) used Weibull's distribution to explain Iranian power company's conversion frequency.

This article continues to adjust the advantages of testing in the mathematical model developed by KS. Bose, D. Et al. (2013) evaluated the reliability, availability and maintenance of diesel engines and their purpose Weibull statistics to explain the error rate. Wait, Hsaio-May. (2009) pointed out that KS testing is a good access method for remote testing based on cumulative distribution (CDF). It also compares chi-square test and KS test.

B. Maintenance Performance Indicator

The Maintenance Indicator Indicator (MPI) is used to measure maintenance performance as a performance indicator is a performance indicator (Router 1998). The MPM system includes the relationship between all relevant maintenance indicators and their entire maintenance process. It can be used as an indicator to maintain the operation and maintenance of the early warning system during the process, indicating procesens current mode to enable evaluation, prediction and correction. In the maintenance process, the MPI logo can further analyze the weaknesses in the solutions that show that the problem has finally found a best practice. Therefore, it is important that the MPIs used are clearly defined, explained and standardized so that they can be understood by each employee as an expression of the same meaning (Ahren and 2009 Parida). There are many MPI applications that use different industries to identify and select to meet the meticulous and specific requirements of the organization (Kobaccy and 2008 Murti).

In addition to four perspectives (customers, internal, financial innovation and learning processes), Kaplan and Norton (1992) have three other criteria, such as health, safety and environment (HSE), climate and plant/team considerations, and incorporate relevant Indicators in MPM framework by Parida and Kumar (2006). 'Plant/ Equipment related indicators' measure the performance pertaining to the plant and apparatus of the administrations. These MPIs provide relevant information to different levels of management in order to make the right decisions. As described by Kobaccy and Murthy (2008), some of the MPIs considered in this standard are as follows:

Availability: This is expressed as a percentage of the availability of the factory used for manufacturing/production and is calculated as the ratio of the mean time to failure (MTTF) of the total time, ie MTTF plus mean time to repair (MTTR).

Performance (yield per hour): This MPI represents the production rate and is expressed as a percentage of yield/performance.

Quality: The MPI refers to the quality of the product/service. This is the percentage of good products produced from the total number of products produced.

Number of small and large sites: This indicator is the number of small or large sites. Stop can also quantify in time (hours and minutes)

Downtime for small and large booths: Express the total number of stops or each smaller and larger pressure in hours and minutes.

Depth: Return to work due to lack of time (hours and minutes) for maintenance (eg, no drawing tools), the number of documents to perform repairs, and the cost of performing repairs (Kobaccy and Murthy 2008).

C. Factors Related to Measures of Performance

This section describes the various factors that researchers have considered when examining performance measurements, such as productivity and technical measures, and other aspects of manufacturing performance, including the overall effectiveness of the equipment. The influence of influencing factors on performance, productivity, safety and various other parameters was discussed. Chakrabarti (1984) studied the key factors affecting technological innovation and its political consequences. Consider some general guidelines for setting policies. Hunt and Pomykalski (1985) analyzed factors affecting technological innovation, such as economic conditions, market size, funding sources, patents, and licensing.

3. BREAKDOWN (EMERGENCY) MAINTENANCE

With an effective preventative maintenance program, the risk of errors can be significantly reduced. However, there are still unfortunate mistakes. Even well-maintained organizations must be prepared for mistakes. Of course, the organization's reliance on preventative maintenance is low. They still need more effective ways to prevent surrender. Unlike preventive maintenance, management cannot plan for

errors but it should be dealt with as soon as possible. The following rules are used to handle errors:

1. Support or support devices that can be used quickly.
2. Inventory of spare parts that can be used when necessary, which facilitates parts ordering and avoids existing working stocks so that other equipment is less affected by the equipment and stops the machine immediately.
3. Be able to deal with emergencies (for example, know how to turn off the equipment) and at least some minor repairs on your computer.
4. Trained and maintainable maintenance personnel can diagnose and correct problems on the team.

Whether an organization fights for one or all of the previous rules depends on the importance of a particular device to the entire production system. On the one hand, the equipment is the focus of the center (such as newspaper presses or important parts of the car, such as brakes, steering, gearbox, engine and ignition). On the other hand, it is a computer that is rarely used because it does not have important functions in the system and can be replaced at any time. Placement When disruption is frequent and/or costly, it is a leader in business decision making. This is important: What are replacement costs and continuous costs?

Maintenance and repair? This problem is sometimes difficult to solve, especially if future mistakes are difficult to predict. Historical data can help you predict future experiences. Most of us have similar decisions for our cars: When is the replacement time? The alternative to making a replacement before the error may be economic is to replace the components in the group. Replacing all components before the majority begin to fail can save costs. The following example illustrates this situation.

A maintenance manager at a large factory asked if he would use all 3,000 fluorescent lamps to illuminate the length of the replacement handle. 4 Work Attachments There are three bulbs in the accessory (1000). They light up about 4,000 hours a year. Incandescent lamps have a nominal life of 25,000 hours and a standard deviation of 5,000 hours (the life of light is usually distributed). If you replace all the bulbs, it will take 12 minutes to find the accessories, but if you change the bulb, it will not work and it will take 20 minutes (since the storage scale has been removed and will not drop after work)). Labor costs are $15 per hour. The cost of each bulb is $1.35 (note that due to the large number of products purchased, the replacement group will cause the price to drop, but ignore this fact here). What is the best area for an incandescent lamp replacement (this year).

4. PREVENTIVE MAINTENANCE APPLICATION

The main problem with the PM application is to determine the best time to perform the task (replacement or inspection) of PM (Jardine, 1973). If the task is too early, the components can not be used in full. If that is the interval Too much time due to involuntary maintenance (restored due to sudden error) because the machine's downtime is too long. On the other hand, most manufacturers recommend that the PM interval be used to guarantee warranty rights. Manufacturers determine that these time intervals can not achieve the maximum benefit of the PM strategy (Bahrami et al., 2000). One of the solutions to this problem is the use of a maintenance optimization model or a PM optimization model.

According to Dekker (1995), PM refers the optimization model to the mathematical model, which aims to determine the optimal time / range to optimize PM to maximize a number of criteria, such as error costs, gains, time inactivity or minimization. Availability and reliability. Declare the term PM optimization model.

5. INSPECTION MODEL

Detection is a process of identifying the current state of a machine that detects errors or hidden signs that can cause significant damage. It is usually used for complex systems (Jardine, 1973). Therefore, preventive measures can be taken before serious mistakes, such as minor adjustments, minor repairs, minor changes or cleaning (Hauge et al., 2002). Some examples of inspection activities are techniques for physical control (control) and control of conditions such as vibration test, noise, radiation, oil and temperature. The advantage of the inspection is to avoid serious errors in the machine (Bahrami et al., 1998). Many test models have been suggested to determine the best time to perform the test, and Barlow et al. (1963) introduced the first basic model. After the introduction of Barlow, several models of inspection were developed and adapted from various case studies Problem.

For example, inspection models are widely used in equipment or emergency and storage systems. Jardine (1973) suggested, for example, the best model for detection of equipment used in emergency situations such as fire extinguishers and alarm systems. The advantage of this model is to determine the optimal inspection time to maximize the use of these devices in emergencies. The long-term storage system, its reliability can fall over time. Therefore, you should regularly check and maintain the storage system for greater reliability and accessibility. Ito and

Nakagawa (1995) have suggested the best detection model for storage systems such as weapons and equipment. The purpose of this model is to determine the optimal inspection time to maximize the reliability of this storage system. On the other hand, Ito et al. (1995) extended the best detection models for storage systems, such as missiles and spare parts for aircraft, to maximize system reliability. In other cases, the inspection method is also used in case of a random error or a random shock system. For example, Mathew and Kennedy (2002) developed an optimal test model based on malfunction caused by random load loads. The purpose of this model is to reduce the error rate and minimize the cost of errors. Chelbi and Ait-Kadi (1999) and (1995); Hariga (1996) developed and suggested a detection model to determine the optimum detection time for a system that was subjected to a random error. The purpose of this model (test model) is to minimize the cost of preventive and corrective measures. Chelbi and Ait-Kadi (2000) have proposed the trial The system collides randomly to maximize system availability.

6. CONCLUSION

This Paper investigate the effectiveness of PM and how it works in production systems. In particular, the structure of this document is divided into several sections. In the introduction' section, overviews of problems faced in maintenance was performed for the first time before introducing maintenance technology. The implementation of PM is described in the next section. The following sections organize and develop the PM planning and programming framework. According to the company's case study, the following sections are discussed, including data analysis, PM planning model, and PM planning model. Section 4 discusses the analysis of the maintenance plan. In order to show the actual part of the PM, suggestions for improvement were made in the last paragraph before the conclusion.

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