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## Maintenance Management Strategy at Faringa Laundry: Improving Efficiency and Reliability

<sup>1</sup>Anashrullah, Business administration study program, Sekolah Tinggi Ilmu Administrasi (STIA) Adabiah Padang

<sup>2</sup>Meci Nilam Sari, Business administration study program, Sekolah Tinggi Ilmu Administrasi (STIA) Adabiah Padang

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### ABSTRACT

Faringa Laundry is a laundry service business that has been operating since 2018 and is known for its quality service. This research analyzes maintenance reliability management at Faringa Laundry to identify the maintenance strategies implemented, factors that affect equipment reliability, and metrics used to assess reliability. The analysis was conducted on key assets that require maintenance, such as washing machines, steam irons, and dryers. This research uses MTBF (Mean Time Between Failures) and MTTR (Mean Time To Repair) metrics to measure reliability and repair efficiency. The results show that Faringa Laundry implements a corrective maintenance strategy, where repair actions are taken only after a breakdown occurs. This study recommends implementing a more structured preventive maintenance strategy to improve equipment reliability and longevity and reduce the frequency and cost of repairs.

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**Corresponding Author:**

Meci Nilam Sari

Business administration study program, Sekolah Tinggi Ilmu Administrasi (STIA) Adabiah Padang  
mecinilam38@gmail.com

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### 1. INTRODUCTION

In the era of advanced globalization, business competition in various sectors continues to increase, requiring companies to maintain high operational efficiency [1], [2]. In this context, the role of equipment maintenance is becoming increasingly vital. Equipment used in production must be reliable to support smooth operations, reduce downtime, and increase productivity [3], [4]. Therefore, maintenance reliability management is one of the crucial aspects that every company must pay attention to.

Faringa Laundry was established in 2018 on Jl. Dr. Moh. Hatta, Limau Manis, Kec. Pauh, Padang City, is one of the laundry service businesses that has gained a good reputation among the local community, especially among students. The business offers washing and ironing services for various clothes, including daily wear, blankets, mattresses, and dolls. The quality of service offered by Faringa Laundry depends heavily on the reliability of the equipment, such as washing machines, steam irons, and clothes dryers.

Over time, the intensity of such equipment will certainly increase, affecting its performance and reliability [5], [6]. If maintenance is carried out regularly and properly, the risk of damage will increase, which can positively impact business operations [7], [8]. Therefore, Faringa Laundry must implement an effective maintenance strategy to ensure that all equipment functions at its optimal capacity and has a long service life.

This research aims to analyze the maintenance reliability management at Faringa Laundry, focusing on critical assets that require regular maintenance. Through this analysis, it is expected to identify the most suitable maintenance strategy, factors that affect equipment reliability, and metrics that can be

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used to measure maintenance effectiveness. This research will also provide recommendations that can help Faringa Laundry improve operational efficiency and reduce the risk of equipment failure.

## 2. METHOD

This research uses a qualitative approach to analyze maintenance reliability management at Faringa Laundry. Data collection was conducted through interviews, direct observation, and literature study. Interviews were conducted with the owner of Faringa Laundry to obtain information about the maintenance strategy implemented, the problems often faced, and the approach used in repairing equipment such as washing and drying machines. This interview also explores details about the cost and time required for maintenance.

Direct observation was conducted to assess the actual condition of the equipment used at Faringa Laundry. These observations included identifying frequent breakdowns and evaluating the staff's maintenance practices. The data collected helped us understand the frequency of breakdowns and the effectiveness of existing maintenance.

A literature study gathered theories and concepts relevant to Maintenance Reliability, including maintenance strategies, factors affecting reliability, and metrics such as MTBF (Mean Time Between Failures) and MTTR (Mean Time To Repair). This literacy provides a strong theoretical foundation for analyzing data obtained from the field.

Once the data was collected, a descriptive analysis was conducted to identify the main factors affecting maintenance reliability at Faringa Laundry. Reliability metrics were calculated to provide a concrete picture of equipment performance. Based on the results of this analysis, recommendations were made to improve operational efficiency, including implementing preventive maintenance strategies, more proactive repairs, and more effective budget planning.

## 3. RESULTS AND DISCUSSION

### 3.1. Results

Maintenance Reliability is divided into two definitions, namely Maintenance and Reliability. Maintenance is all the activities involved in keeping system equipment functioning. While Reliability is the chance that a machine will function properly for a certain time. Maintenance Reliability is a combination of Maintenance and Reliability. Maintenance Reliability involves efforts to maintain reliability in the sense of ensuring equipment works at optimal performance levels and preventing failures by identifying and preventing possible failures that can disrupt operations. Maintenance strategies in Maintenance Reliability can be carried out using three methods, namely: a) Predictive Maintenance. Using data and analysis to forecast future maintenance needs, b) Preventive Maintenance. Regular maintenance schedules to prevent failure based on planned preventive maintenance, and c) Corrective Maintenance. Corrective action taken after a failure occurs.

Factors that can affect Maintenance Reliability such as Equipment Design and Quality, Environmental Conditions, and Maintenance Planning. Good design and high quality equipment can improve reliability. Environmental factors such as temperature, humidity, and operational conditions can also affect equipment reliability. In addition, effective and timely maintenance scheduling and execution greatly affect Maintenance Reliability. Next is the metrics in Maintenance Reliability. Metrics in Maintenance Reliability are divided into two, namely a) MTBF (Mean Time Between Failures), which is the average time between two failures on the equipment. Formula:  $MTBF = \text{Total operating time} / \text{Number of failures}$  and b) MTTR (Mean Time To Repair): The average time it takes to repair equipment after a failure occurs. Formula:  $MTTR = \text{Total repair time} / \text{Number of failures}$ .

### 3.2. Discussion

In Faringa Laundry, the maintenance assets include two washing machines, one steam iron, one steam cylinder, four dryers, and one 3kg gas cylinder. The laundry's long operating hours, from 09:00 am to 7:00 pm daily, add to the challenge of maintaining optimal machine performance. The most common breakdown is a rubber break on the dryer, which requires replacement once a month with a repair duration of about 40 minutes per incident.

The calculation of metrics in maintenance reliability at Faringa Laundry shows that the Mean Time Between Failures (MTBF) for the dryer is 236.67 hours, and the Mean Time to Repair (MTTR) is 40 minutes per occurrence. While the MTBF figure indicates that the machines can operate considerably

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before failing, the relatively low MTTR figure indicates the short time taken to repair a failure. This reflects the effectiveness of technicians in handling repairs, although there is still room for improvement in preventive maintenance to reduce the frequency of failures.

Several previous studies support the importance of preventive maintenance in improving equipment reliability and reducing the frequency of breakdowns. In their study on operational management, Hamali et al., emphasized that planned preventive maintenance can significantly reduce downtime and improve operational efficiency [9]. This study is in line with the findings at Faringa Laundry, where the corrective maintenance approach led to a higher frequency of breakdowns despite the relatively short repair time.

Furthermore, Xu & Saleh, states that the reliability of equipment is highly dependent on the quality of the design and materials used [10]. This finding is relevant to the conditions at Faringa Laundry, where Samsung brand washing machines are considered more durable than other brands. This suggests that investing in high-quality equipment can reduce the risk of failure and improve long-term reliability.

In addition, Chen & Tang research emphasizes the importance of structured maintenance budget planning to avoid the uncertainty of repair costs and maintain operational stability [11]. This aligns with the situation at Faringa Laundry, where varying service costs indicate the need for clearer and more consistent budget planning.

Based on the relevant research results, Faringa Laundry is advised to implement more scheduled preventive maintenance. This could include regular cleaning, replacement of worn components before they fail, and periodic inspections to detect potential problems before they become more serious operational disruptions. Implementing this strategy can reduce the frequency of breakdowns and increase equipment lifespan [12].

Overall, a more proactive approach to maintenance reliability, supported by findings from relevant research, can provide many benefits to Faringa Laundry, including reduced downtime, increased equipment life, and long-term cost savings. Recommendations to improve the maintenance process at Faringa Laundry include using the correct amount of detergent, cleaning irons regularly, ensuring washing machine capacity is not excessive, and cleaning equipment after use. These actions will maintain equipment performance and ensure that the service provided remains consistent and satisfactory to customers.

#### 4. CONCLUSION

Faringa Laundry implements a corrective maintenance strategy, where repairs are made only after a breakdown occurs. While this approach is effective in the short term to keep operations running, it tends to increase the frequency of breakdowns and potential downtime, which can affect the overall smoothness of operations. While efficient in terms of quick fixes, this approach cannot anticipate potential problems that could have been avoided with more proactive preventive maintenance.

The calculation of Mean Time Between Failures (MTBF) and Mean Time to Repair (MTTR) shows that the dryers at Faringa Laundry have a fairly long operating time before failing, and the repairs performed by technicians take place in a short time. However, relying solely on corrective maintenance could increase the frequency of failures, which in the long run could result in higher maintenance costs and service disruptions.

Relevant research shows that implementing a scheduled preventive maintenance strategy can significantly reduce the risk of breakdowns and improve equipment reliability. With regular cleaning, replacement of worn parts, and periodic inspections, Faringa Laundry can minimize operational disruptions and extend the equipment's service life. In addition, more structured maintenance budget planning will help manage costs more effectively and reduce uncertainty in spending.

By adopting a more proactive and planned maintenance approach, Faringa Laundry can optimize operational efficiency, reduce downtime, and improve customer satisfaction. Implementing these preventive measures will not only maintain equipment performance but also ensure that the service provided remains consistent and satisfactory, thus providing a competitive advantage for this laundry business.

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