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PLANNING FOR EXTENDING THE INTERVAL OF DAILY MAINTENANCE FROM 3 DAYS TO 6 DAYS (STUDY CASE: PT MRT JAKARTA)

Rizlia Nurmawarni Soleiman [1], Dahlan [2], Insan Kamal [3]
[1,2,3] Institut Transportasi dan Logistik Trisakti, Jakarta, Indonesia
✉corresponding author: rizlianur@gmail.com

Abstract: The railway system in Indonesia has developed rapidly, as well as railway technology in Indonesia, especially in DKI Jakarta, namely MRT Jakarta. People use MRT train services to travel from one place to another with very high mobility and a very tight schedule, so that MRT train maintenance needsto be carefully considered for the safety of transportation service users. As a train operator that provides services, MRT Jakarta must pay attention to quality and facilities. rail transportation services. Providing a safe, reliable, and comfortable public transportation network is the mission of MRT Jakarta.To maintain and improve safety, it is necessary to handle maintenance. Scheduled daily maintenance at PT MRT is every 6 days, but what is currentlyhappening is every 3 days, this is due to the application of a trial and error system on components. Therefore a method is needed to restore the treatmentinterval from 3 days to every 6 days.

Keywords: *Railway Maintenance, Daily Maintenance, Maintenance Interval, MRT Jakarta*

Introduction

The railway system in the world has developed rapidly, as well as railway technology in Indonesia, especially in DKI Jakarta, namely MRT Jakarta. People use MRT train services to travel from one place to another with very high mobility and a very tight schedule, so train maintenance on the MRT needs to be considered carefully for the safety of users of transportation services. Maintenance is defined as an activity or task designed to return an item to a state in which it can perform its designated function.

As a train operator that provides services, MRT Jakarta must pay attention to the quality and feasibility of rail transportation service facilities. Providing a safe, reliable and comfortable public transportation network is MRT Jakarta's mission.

According to (PM 121, 2017), trains are transportation in the form of vehicles with motion power, either running alone or in combination with other vehicles that will or are moving on the rails. Train is a means of mass transportation which generally consist of locomotives (vehicles with self-propelled power) and a series of trains or carriages (coupled with other vehicles).

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In order to maintain and improve the reliability of the train then treatment is required. Maintenance activities at MRT Jakarta consist of daily maintenance, monthly maintenance (P1), 3-month maintenance (P3), 6-month maintenance (P6), 12-month maintenance (P12), and final treatment (overhaul). Scheduled daily maintenance at PT MRT Jakarta every 6 days, but what is happening now is every 3 days, this is due to the application of a trial and error system on components (because the MRT is still new) because it has been operating for 3.5 years on average then want to be returned to 6 days with the design. (Haryono, Darunanto, and Wahyuni 2019)

According to (PM Number 18, 2019) in Article 1 Paragraph 4 “Maintenance of Rolling Stock is an activity carried out to maintain the reliability of Rolling Stock so that they remain operational”. Maintenance of Rolling Stock in Indonesia includes preventive maintenance and repairs to restore functionality. The implementation of maintenance is successful if the system can perform its functions according to plan and does not suffer damage as long as the system is functioning or before the planned timeframe. (Hidayat & Mahardiono, 2015).

When operating a train, the train should in a proper condition. In other words, the necessary conditions for safe operation and comfortable use must be met. Maintaining the performance of trains and trains in new condition is the goal of train maintenance. (Cahyadi, Priyanto, & Ramadhani, 2018).

According to (PM Number 18 of 2019) Article 4 Paragraph 4, "Regular maintenance can be adjusted to the technology of Railway Facilities". Based on the article, the aim of this study is to find a method to restore efficient and effective maintenance intervals. Based on these problems, the authors took a study entitled “Planning the Extension of the Daily Maintenance Interval from 3 days to 6 days.

Methodology

The analytical method used in this research is descriptive statistical analysis. Descriptive statistics are statistics used to analyze data by describing or describing the data that the author has collected during the Internship activity. Data collection was carried out by looking for data sourced from literature

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studies and field reviews in detail so that the following data were obtained: Historical data on Carbon Strip measurements during daily maintenance activities and data on failures that occurred during daily maintenance.

Discussion and Result

Daily Maintenance at MRT Jakarta is carried out every 3 days to ensure the Railway Facilities on MRT Jakarta are ready to operate on the Mainline. Daily Maintenance is carried out at the Inspection Track or INT. Inspection Track is a place to do maintenance, INT at PT MRT Jakarta has 2 lines, where the track 1 is for Daily Maintenance and track 2 is used for Monthly Maintenance. Based on the checksheet, the daily maintenance activities carried out include checking visual components and replacement of consumable parts such as Brake Shoe, Contact Strip, and Wipers Water. During maintenance activities, 2 technisians (1 leader 1 staff) or 3 technicians (1 leader and 2 staff) are required.

MRT Jakarta operation in normal condition starts from 5 AM until 11 PM with 5 minutes headway during peak hours and 10 minutes at normal hours or weekends. The operational time of MRT Jakarta is tentative during the pandemic because it depends on the governor's regulations through the transportation agency which always pays attention to confirmed cases of COVID-19 in the Jakarta area.

Rolling Stock PT MRT Jakarta is a type of self-propelled train and the driving source is electric power or KRL whose formation consists of 6 trains. From January 2022 – July 2022 there are recorded interrupt intervals during daily maintenance. The following is a graph of the failres data found during daily maintenance on all Trainsets. In this study, Trainset 1 was not analyzed because Trainset 1 is doing an Overhaul.

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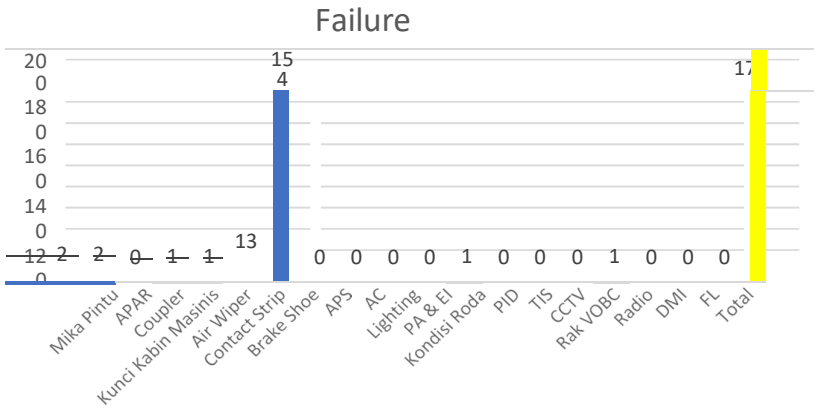

Figure 1 Failure Interval

Source: Author Analysis

Based on the picture above, that the total failures found during daily maintenance activities was 175, including failures on Brake Shoe as many as 154 failures, then followed by the Contact Strip with 13 failures. It can be seen that failures that occur in the Brake Shoe and Contact Strip are failures that are consumable parts or run out due to use.

The failures with the smallest quantity found were 2 failures from door mica, 2 APAR conditions, wiper, driver's cab lock, wheel condition, VOBC rack condition. This failure doesn't not include in a dangerous failure, because the failure is not the main item. For mica door and driver's cab lock include corrective maintenance human error for the driver.

Every Daily Maintenance activity, daily maintenance team doing maintenance and inspection of pantograph to keep the facility still operating all the times. Pantograph is a component used on trains as connector from Overhead Catenary System to the train electrical system. There are the main components in the pantograph that have an important role because it is directly related to the Overhead Catenary System, namely Contact Strip. When the train is moving, there will be friction between the contact strip and the OCS cable, this frictional causes a decrease in component material.

During daily maintenance, the daily maintenance team measures the thicknessof the contact strips and the Quality Control team recaps the results of the contact strip measurements. There is a time reference the replacement

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of the contact strip is when the minimum thickness has reached 5 mm, while the new thickness is 17 mm. The following is a graph of the wear age of the contact strip for January 2021 to May 2022.

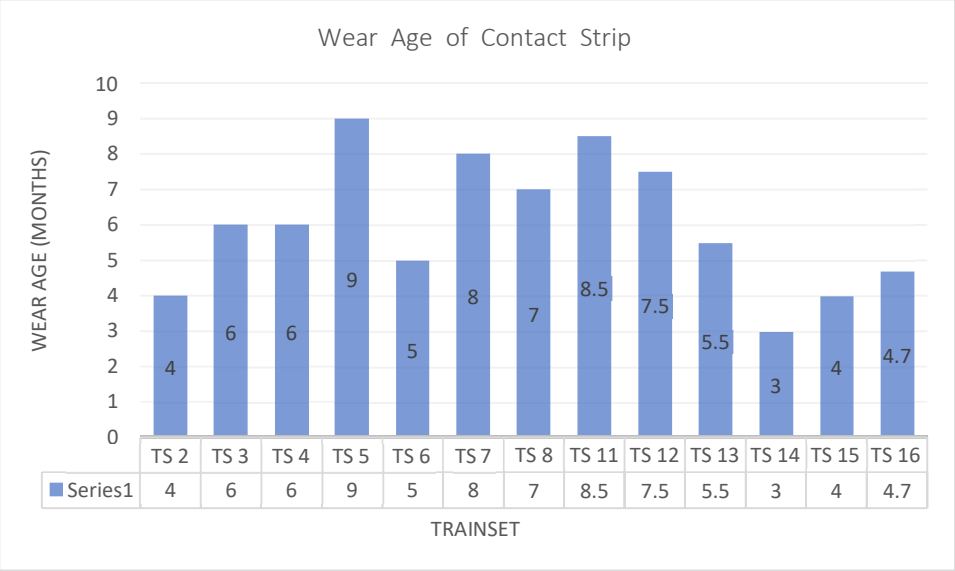

Figure 2 Wear Age of Contact Strip

Source: Author Analysis

Based on the graph above, the average of contact strip replacement time is 6 months, there is an uneven use of the contact strip due to influence of the Trainset operating on the mainline. It can be concluded that the contact strip replacement age doesn't not affect the daily maintenance of 6 days.

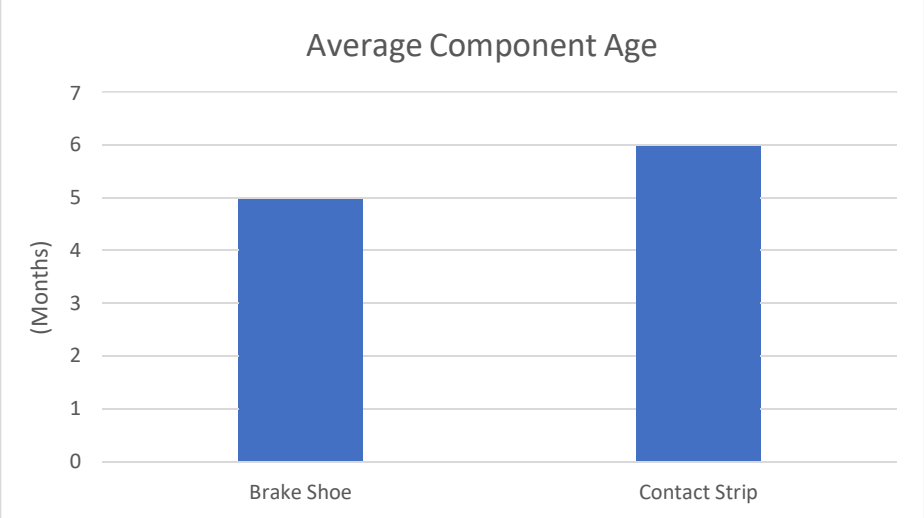

Figure 3 Average Component Age

Source: Author Analysis

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In the graph above is the average component age of the brake shoe and contact strip components, each of which has a wear age of 5 months for brake shoe and 6 months for contact strip. It can be concluded that when measuring contact strip and brake shoe doesn't need to be done every 3 days.

It can be seen that the component which changes frequently is Brake Shoe, the replacement is widely used because in 1 Motor Car or Trailer Car there are 2 bogies, and in those 2 bogies there are 4 wheels, one of which is the Brake Shoe, so the total Brake Shoe is in 1 Trainset is 48 Brake Shoe. So it can be concluded that every Brake Shoe on the wheel must be replaced if the thickness of the Brake Shoe has reached the minimum limit. The new Brake Shoe has a thickness of 57 mm and will be replaced if the thickness of the Brake Shoe reaches 20 mm.

Conclusion

From the previous discussion, it is concluded that the planning for extending PT MRT Jakarta's Daily Maintenance interval can be extended from 3 days to 6 days according to the design. Based on the Daily Maintenance failure data, it shows that the types of failures found are consumable failures, which means it is safe if the daily maintenance on the MRT can be extended to 6 days. The results of the contact strip measurement analysis showed that the average contact strip replacement time was 6 months. By calculating the two things above, it can be concluded that the daily maintenance at MRT Jakarta can be extended to 6 days according to the design.

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