Journal of Airport Engineering Technology (JAET)
https://e-journal.poltekbangplg.ac.id/index.php/jaet

Volume: 3, No. 2. June 2023: pp. 75-81
E-ISSN; P-ISSN: 2774-9622; 2775-4871
DOI: 10.52989/jaet.v3i2.101
Submitted: 2023-03-06; Revised: 2023-04-08; Accepted: 2023-05-05

AVIOBRIDGE MAINTENANCE MANAGEMENT: A SOLUTION FOR CABIN CURTAIN DAMAGE

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Abstract

This research raises the problem in one of the traction equipment after the absence during covid-19 with evidence that an occurrence causing trouble with the curtain results from a lack of monitoring and maintenance. As a result, the curtain gets out of the way of the cabin, which causes the following impacts passenger may be trapped, unstable curtain movement rotation, and the sound of the curtain becomes harsh. This research aims to prevent further damage to the cabin curtain, considering that aviobridge is one of the supporting flight operations at the airport. This research uses an exploratory study using literature, observations, and interviews. This research indicates that maintenance to aviobridge does not conduct appropriately during the pandemic causing problems for the aviobridge. The result is expected that maintenance will be carried out according to applicate standard operating procedures such as lubricants between the curtains using lubricants such lubrication simultaneously with the movement of the cabin rotation to the right and left, checking the roller curtains at the top and bottom using shock lock 32, and adjusting the gear up and down if already loose. Intensive preventive maintenance is the key to establishing any facilities and the sign of a good quality of production in the industry. The researcher calculated the Mean Time Between Failure (MTBF) and Mean Time To Repair (MTTR) with the sample to the parking stand N06 and proposed that the organization obeys the applicable standard operating procedures for maintenance.

Keywords: *aviobridge, cabin curtain, maintenance, damage*

Introduction

Airport infrastructure needs, procedures, equipment requirements, and safety considerations, such as industry standards and laws, are all part of ramp operations (Yazgan et al., 2022). Generally, integrating this new technology into the existing infrastructure and public transport network is increasingly being discussed in society and politics (Feldhoff & Soares Roque, 2021). Aviobridge is one of the airside facilities and operations that affect how passengers perceive an airport (Irawan et al.,

2018). Various facilities and procedures are needed to assist passenger flow through a modern terminal, including an interface with ground transportation and aircraft. According to the Regulation of the Director General of Civil Aviation SKEP/302/V/2011 Chapter 1 Article 1 No. 14. Aviobridge is a transport facility in the shape of an alley that connects an airplane with the airport terminal building. It is used for passenger boarding and deplaning to and from either the airplane or the terminal building. Through the control panel at the tunnel's end, an officer or operator who has received formal authorization from the Indonesia Airport Authority controls the aviobridge (Wedari, 2019). When the plane is parked perfectly, the tunnel aviobridge extends and affixes to the door aircraft (docking). The ground handling officer is consulted after the officer aviobridge has been properly installed. Lastly, it will let the flight attendant know when the door of the aircraft is ready to open. The aviobridge is taken off the airplane door, and vice versa (undocking) (Mufidah et al., 2019)

There are 3 (three) aviobridges under the BUKAKA brand that use tunnel glass in their designs. An obstruction known as the curtain that came out of the cabin happened during the use of the aviobridge at Parking Stand (PS) N06. Lack of weekly maintenance (lubrication) on the cabin curtain led to the curtain coming out of the cabin line. The importance of this research so that these problems do not occur again given the importance of aviobridge as one of the main support for flight operations at the airport. If the problem is not resolved, it will hamper flight operational activities. With this research, researches can learn about aviobridge maintenance procedures, be able to know its parts, components and functions, and be able to practice skills and work together.

Considering aviobridge is one of the supporting flight operations at the airport and evaluation of terminal facilities needs to be done regularly so that the infrastructure can always function properly efficiently and effectively. The maintenance and operation of the aviobridge influence the performance of the aviobridge (Sari et al., 2021), therefore this is investigated as a material to determine how much maintenance is carried out to better maintain the performance of the aviobridge to improve the quality of service to users of the aviobridge service by calculate Mean Time Between Failure (MTBF) and Mean Time To Repair (MTTR) with a sample to the parking stand N06. This research also conducts a repairment to the Cabin Curtain Damage maintenance so it can perform properly.

Methods

This research is an exploratory study of the maintenance unit starting with observing the maintenance of aviobridge facility during covid-19 (Franciosi et al., 2020; Mahrami & Christina, 2021). According to Prof. Dr. Sugiyono, research and development methods or commonly reffered to as Research and Development or R&D are the stages of testing the effectiveness of a product that can function as an activity for planning, drawing or manufacturing an object system, component or structure that aims to produce products that have not been has existed or is a development of a previous product and becomes a single unit that will produce use value through several stages of testing. This study continues with literature studies and long observations.

The literature review carried out in this study was carried out by looking for references in several journals or books that were relevant to the research. After getting references, researches read every reference that is obtained. After conducting a literature review, data collection was carried out. Data collection techniques that researchers use in this writing are literature review in this study, the source of data is obtained from relevant literature such as books, journals, or scientific articles related to the chosen topic. Technique data collection used in research. This library is looking for data about things or variables in the form of notes, books, papers or articles, journals, etc that are compiled and resumes (Putri, 2019).

Researchers also carry out observation techniques, which are very commonly used in research. Direct observation or what is commonly called observation. Early techniques to collect data by looking at the activities carried out directly. In this study, the researcher used observation techniques when the researcher conducted in the first On the Job

Training at Jenderal Ahmad Yani Semarang International Airport.

Results And Discussions

Based on PM 77 of 2015 Standardization and Certification of Airport Facilities regarding the fulfillment of safety requirements in the use of airspace, aircraft, airports, air transportation, flight navigation, as well as other supporting facilities and public facilities. Jenderal Ahmad Yani Semarang International Airport has three aviobridge units located at Parking Stands N05, N06, and N07. At the aviobridge located at Parking Stand N06, there was a problem with one of the components in the aviobridge cabin, called the cabin curtain. The cabin is made of steel, with sections of exterior primer, and interior with floor covering, ceiling, and lighting. The electric motor is installed at the bottom of the cabin and serves to rotate the cabin. The cabin also have a side curtains, swinging doors, a control console, a distribution panel, and an auto leveler (Loka et al., 2017).

The problem indication is during a pandemic, PT. Angkasa Pura I (Persero) especially at Jenderal Ahmad Yani Semarang International Airport, decided to minimize technicians to streamline the budget. This decision affected all technicians in the aviobridge unit. So that no maintenance was carried out but the aviobridge unit on the cabin curtain section of the aviobridge N06 has trouble, namely the curtain is coming out of the cabin lane.

From the results of checking it can be concluded that the lack of maintenance was not carried out properly so that the curtain came out of the cabin path, indications of this problem include between the dry curtains, the curtain gear at the top of the cabin is loose and the top and bottom bolts on each side of the curtain are loose. This of course will have an impact on the cabin curtain work system and can also be dangerous for passengers. Influence and impact, if the curtain comes out of the cabin path, called passengers, may be trapped, unstable curtain movement rotation, and the sound of the curtain becomes harsh.

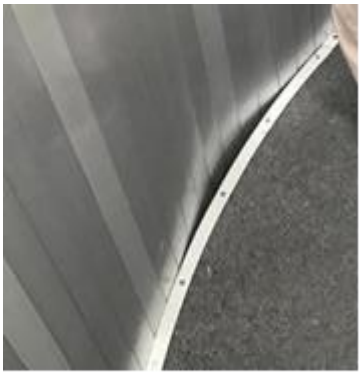

Figure 1. The curtain is out of the way of the cabin

The maintenance and operation of the aviobridge influence the performance of the aviobridge, therefor this is investigated as a material to determine how much maintenance is carried out to better maintain the performance of the aviobridge to improve the quality of service to users of the aviobridge service. According to KP No. 22 of 2015 concerning Competency Standards for Personnel in the Aviobridge Service Field. Aviobridge operators must have the competence to explain related laws and regulations, be able to explain the types, parts, and functions, as well as the aircraft's nationality, and be able to explain and carry out aviobridge operating activities by provisions.

How to handle so that the curtain does not come out of the cabin path is lubrication on the sidelines of the curtain using lubricant simultaneously with the movement of the cabin rotation to the right and left and check the roller curtain at the top and bottom. How to prevent the curtain from getting out of the way of the cabin is to perform routine daily checks of the right and left curtains. Following are the steps for routine daily curtain checks to carry out lubrication on the curtain's sidelines using lubricant and lubricating the curtain chain outside the cabin.

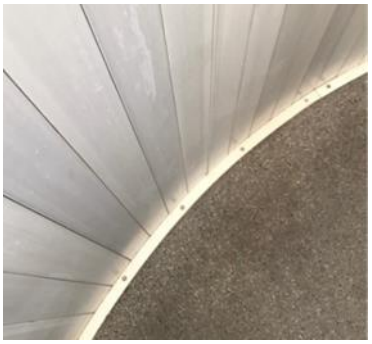

Figure 2. Curtain condition after maintenance

Maintenance on the curtain of the aviobridge, is carried out daily, weekly, and monthly. Curtain daily maintenance done by the sidelines of the curtains must be lubricated using lubricant, simultaneously with the movement of the cabin curtain to the right or left so that the gaps between the curtains do not dry out and the rotation of the cabin becomes stable. Curtain maintenance is checked once every week and month by pressing the curtain from the inside. Curtains that are to things or things will be sunken outward. If the voltage does not match the curtain from the curtain barrel panel winding it will be carried out.

First, remove the curtain barrel cabin cover from the top of the cabin leading to the curtain reel. For the cabin open the lid or cover the curtain barrel which is hinged so that the coil can be seen. After that, position the cabin to the right or left so that the curtain to be adjusted can be fully opened. Rotate the cabin slowly so that the open curtain starts to roll. Turn the aviobridge in the direction that the curtain will fail to roll without manual assistance. Without holding or pressing on the curtain, turn the worm gear counterclockwise for the left curtain and clockwise for the right curtain, until the curtain is pulled tight against the bobbin. Continue this procedure until the curtain rotates from the open position without any problems. Rotate the aviobridge in both directions to check if the curtain has the proper tension.

Based on SKEP 175 of 2003 regarding the availability of equipment (availability) indicates the level of readiness of equipment or group of equipment to be operated (Ali M & Kusuma, 2019; Junaedi & Aspiranti, 2022; Manesi, 2015). Availability is a comparison between the actual operating time and the specified operating time in a certain period.

At the Parking Stand N06 aviobridge, the availability of equipment has been calculated to show the equipment's readiness level with an actual operating time of 12 hours/day and maintenance of 1 hour/day. The following is the result of the availability calculation on the aviobridge based on data analysis that has been carried out using normal working hours, which is 12 hours can be multiplied by 30 days, and the result of defined operating hours is 360 hours. Maintenance is 1 hour/day (does not interfere with flight operation). Then the resolution is the actual operating time divided by the set operating time multiplied by 100% every day.

The following is the result of the availability calculation on the aviobridge which is analyzed daily. Location at Aviobridge Parking Stand N06 and analysis Schedul from 28 June 2021 until 28 July 2021. The reason is to determine the availability of equipment (availability) to indicate the level of readiness of equipment. Actual operating hours are 12 hours/day from 06.00 until 18.00 daily.

Industry must evaluate and improve the equipment's or operating systems' reliability (Christiansen, 2020). The MTBF measures a machine’s typical time before suffering (Rukin et al., 2022; Sudheesh et al., 2021). MTBF is the machine’s total running time ratio divided by the quantity or frequency of operational failures brought on by breakdown.

For the number of failures is 0 where no trouble and maintenance does not interfere with the flight schedule, the MTBF where the actual operating is 12 hours/day divided by 0 from the number of failures and the result for MTBF is 0. Mean Time to Repair (MTTR) calculation starts when the tool is damaged until it returns to normal operation. MTTR shows data on a company's efficiency in responding to and resolving problems. MTTR is a component’s average time to perform recovery or repair efforts. In this study, MTTR is storage cluster recovery time when a hard disk node is simulated damaged.MTTR unit is the same as MTBF. It is named hour. To find the MTTR, the total downtime of equipment due to failure is 1 hour multiplied by 30 days divided by the number of failures 30 days to produce 1 hour

which means does not interfere with flight operation.

Table 1. MTTR and MTBR sample in one month

Date	Actual Operating Time (hours/day)	Maintenance (hour/day)	Availability (%)
28 June 2021	12	1	100
29 June 2021	12	1	100
30 June 2021	12	1	100
1 July 2021	12	1	100
2 July 2021	12	1	100
3 July 2021	12	1	100
4 July 2021	12	1	100
5 July 2021	12	1	100
6 July 2021	12	1	100
7 July 2021	12	1	100
8 July 2021	12	1	100
9 July 2021	12	1	100
10 July 2021	12	1	100
11 July 2021	12	1	100
12 July 2021	12	1	100
13 July 2021	12	1	100
14 July 2021	12	1	100
15 July 2021	12	1	100
16 July 2021	12	1	100
17 July 2021	12	1	100
18 July 2021	12	1	100
19 July 2021	12	1	100
20 July 2021	12	1	100
21 July 2021	12	1	100
22 July 2021	12	1	100
23 July 2021	12	1	100
24 July 2021	12	1	100
25 July 2021	12	1	100
26 July 2021	12	1	100
27 July 2021	12	1	100
28 July 2021	12	1	100

The increase in MTBF following the application of preventive maintenance is a sign that production quality has improved. Simply expressed, the success of the maintenance work is inversely correlated with the rise in MTBF. MTTR provides information on how effectively a business may react to and handle problems as they arise. In contrast to the MTBF, the company benefits more from a smaller MTTR. Simply put, the longer the time required for maintenance, the longer the tool will be unavailable, decreasing production. Based on related research articles, conventionally maintainability aspects are given less importance to reliability aspects. Given reliability and maintainability targets are further allocated to all constituent systems using mathematical techniques (Marg et al., 2021). In this research maintainability is importance of Mean Time To Repair (MTTR), in determining availability of the fighting platform. The extended repair time can be brought on by several factors, one of

which is the lack of spare parts or the lengthy process involved in requesting spare parts. In addition, effective maintenance management can help the organization to manage cost results by preventing damage (Junaedi & Aspiranti, 2022).

Conclusion

The occurrence of trouble with the curtain caused a lack of maintenance so that the curtain gets out of the way of the cabin and causes the following impacts passengers may be trapped, unstable curtain movement rotation, and the sound of the curtain becomes harsh. It is expected that care and maintenance will be carried out by the applicable SOP, such as lubricant on the sidelines of the curtain using a lubricant such a lubricant simultaneously with the movement of the cabin rotation to the right and left, checking the roller curtain at the top and bottom using shock lock 32, and adjust the up and down gear if it is loose. Intensive preventive maintenance is the key to the establishment of any facilities and the sign of a good quality of production in the industry. MTTR and MTBF have an important role in maintenance, the longer the tool will be unavailable, decreasing production. The extended repair time can be brought on by several factors, one of which is the lack of spare parts or the lengthy process involved in requesting spare parts.

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