IJAMESC, Vol. 3 No. 4, August 2025
DOI: https://doi.org/10.61990/ijamesc.v3i4.592 e-ISSN 2986-8645

THE EFFECT OF DELAYS DUE TO FLIGHT OPERATION HANDLING AND ENGINEERING ON ON-TIME PERFORMANCE AT PT. WATER LAMPS AT SOEKARNO HATTA AIRPORT

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Abstract
The purpose of this study is to determine the effect of delays that occur in the handling of flight operations on on-time performance, the effect of delays that occur in technical handling on on-time performance and the effect of delays due to flight operations and techniques on on-time performance on airlines PT. Pelita Air at Soekarno Hatta Airport. In this study, researchers used a quantitative approach with SPSS ver. 27. A sample size of 50 respondents was obtained. Instrument regression tests were carried out, apart from that, statistical tests were also carried out, which included simple regression tests, multiple regression tests, simple correlation tests, multiple correlation tests, and determination of the coefficient of determination. Hypothesis testing was also carried out which included partial tests (t tests) and simultaneous tests (F tests). The results showed that Flight Operation had a significant positive effect on On-time Performance, Engineering had a significant positive effect on On-time Performance. The results of the F test show that the F-count value is 131.516 > 3.2 with Sig. 0.000 < 0.05. This means that the independent variables together have a significant effect on the dependent variable.

Keywords: Delay, Flight Operation Engineering and On-time Performance

1. Introduction

Transportation is a very important human need in the era of technology that continues to develop. With the advent of transportation, human activities have become easier and faster, and the demand for transportation services will increase. In a contemporary society like this, the movement of people both inside and outside a nation is highly correlated with the existence of transportation infrastructure. There are three types of transportation: land, sea, and air. Means of transportation is another name for a technology that, if used properly, can move a person from one location to another while maintaining safety. These include passenger aircraft, private jets, and helicopters that utilize short-penetrating radar and can easily maneuver to a variety of locations. Usually, the airline will provide ownership aircraft for its passengers. Aviation is a business that sells transportation services using special transportation vehicles.

Competition as an airline that operates both domestic and international flight routes in Indonesia, on-time performance (OTP) that cannot be achieved with delays. The punctuality of flights, during the departure and arrival of the aircraft, is a very important aspect of an airline company in providing services to air transportation service users. This is one of the parts that passengers expect in addition to safety and comfort aspects. Punctuality in the implementation of flight schedules will be the main consideration and benchmark for the trust of air transportation service users. Being in a fast-paced and

modern era makes time a top priority for all passengers. Therefore, airlines, including Pelita Air as one of the large domestic airlines, are required to be able to provide services with a high level of on-time display. However, the problem that often occurs in airlines is delays.

Delays in the aviation world are aircraft that experience a situation of delayed departure and delayed arrival caused by several factors, such as weather factors, poor management by the airline in arranging departures, number of aircraft, airline errors in punctuality, pilot delays, cabin crew delays, delays in refueling, runway factors, engine damage, and so on (Ministry of Transportation, 2018). The problem of flight schedule delays is a problem that requires serious handling. This is the responsibility of the entire work unit of the airline company, one of which is the activities of operation flight services. This is because in an airline company each activity is an integrated chain unit, if one work unit does not work well it will affect the overall flight operation service. Flight delays that occur to an airline company will have a direct impact on operating costs and the image of the airlines themselves.

2. Theoretical Background

2.1 Management

Management is the science and art of regulating the process of utilizing human resources and other resources effectively and efficiently to achieve a certain goal (Hasibuan, 2018:2). This definition emphasizes that management is not only a technical process based on rules and principles (science), but also requires creativity, leadership, and decision-making skills (art) to optimize available resources. Effective management ensures that goals can be achieved in accordance with organizational plans, while efficient management ensures that resources are used economically without waste. Thus, management functions as a systematic process that integrates planning, organizing, actuating, and controlling to direct all efforts toward the achievement of objectives.

2.2 Human Resource Management

Human Resource Management is the science and art of managing the relationships and roles of the workforce so that it is effective and efficient in helping the realization of the goals of the company, employees, and society (Hasibuan, 2018:10). This concept highlights that HRM is not only about administration of personnel, but also a strategic function that integrates planning, development, motivation, and evaluation of employees. Effective HRM ensures that the right people are placed in the right positions, employee potential is optimized, and organizational performance increases while still paying attention to employee welfare and social responsibility.

2.3 On-time Performance

On-time Performance is a situation when the departure time and arrival time of the aircraft are in accordance with the preset. On-time Performance is important because an aircraft has a useful value when the aircraft is in the air. In the aviation industry, OTP is one of the main indicators of service quality and operational reliability. High OTP reflects effective coordination between scheduling, maintenance, ground handling, and air traffic control, which in turn builds customer trust, reduces operational costs, and increases competitiveness of the airline (Setiawan et al., 2021; Belobaba, Odoni, & Barnhart, 2016; Doganis, 2019).

2.4 Flight Operations Engineering

Aircraft operation techniques refer to the knowledge, skills, and methods related to the design, manufacture, maintenance, and operation of aircraft. Aircraft engineering encompasses a wide range of disciplines and practices used to ensure the safety, reliability, and efficiency of aircraft. Flight operations engineering also involves optimizing aircraft performance, fuel efficiency, flight safety, and compliance with international aviation standards. This field bridges between technical aspects (such as aerodynamics, propulsion, avionics) and operational aspects (such as flight planning, route optimization, and safety management) (Kinnison & Siddiqui, 2017; Zhang et al., 2018; Civil Aviation Safety Authority [CASA], 2018).

2.5 Delay

Delay is a term used when a flight experiences a delay that exceeds a set departure or arrival time (Regulation of the Minister of Transportation, 2015). Delays can occur due to internal factors (such as technical problems, operational disruptions, or crew availability) and external factors (such as weather conditions, air traffic congestion, or airport infrastructure limitations). Delays not only affect passenger satisfaction but also increase operational costs for airlines. Therefore, delay management is a crucial part of flight operations to maintain service quality, efficiency, and customer loyalty (Li et al., 2021; Fleurquin, Ramasco, & Eguiluz, 2013; Carvalho et al., 2020).

3. Methods

The method used in this study is a quantitative approach method. The quantitative data in this study is the result of the distribution of questionnaires to employees of PT. Water lamp. The data source used in this study is primary data. The population in this study is 100 employees of departments/office sections. To determine and find out how much of the sample was taken, the researchers used the slovin formula. In this calculation, the researcher set a maximum error limit of 10% with a population of 100 employees of departments/office sections, (n) obtained amounting to 50 people. Using a sampling technique with a simple random sampling technique which is included in probability sampling. This study uses a Likert scale score of 1 to 5.

Data analysis in this study was carried out using multiple linear regression analysis with the assistance of the SPSS 27 software. The regression model was applied to determine the effect of the independent variables on the dependent variable. Before conducting hypothesis testing, descriptive statistics were applied to provide an overview of the respondents' characteristics and their responses to the questionnaire items.

To ensure the feasibility of the regression model, classical assumption tests were conducted, consisting of Normality Test, Multicollinearity Test, Heteroskedasticity Test, Autocorrelation Test. The results of these tests confirmed that the regression model in this study met the assumptions of normality, non-multicollinearity, homoscedasticity, and no autocorrelation. Thus, the model is appropriate for further hypothesis testing.

4. Results and Discussion

4.1 Validity Test

Validity testing carried out through the SPSS program using product moment correlation produces the value of each statement item with the overall question item score and for more details is presented in the table as follows:

Table 1. Validity Test Result

Variable	Calculated R-value	Table R-value	Decision
X1.1	0.130	0.22	Valid
X1.2	0.155	0.22	Valid
X1.3	0.495	0.22	Valid
X1.4	0.791	0.22	Valid
X1.5	0.569	0.22	Valid
X1.6	0.606	0.22	Valid
X1.7	0.599	0.22	Valid
X1.8	0.421	0.22	Valid
X1.9	0.367	0.22	Valid
X1.10	0.440	0.22	Valid
X1.11	0.259	0.22	Valid
X1.12	0.596	0.22	Valid
X1.13	0.541	0.22	Valid
X.14	0.624	0.22	Valid
X.15	0.667	0.22	Valid
X2.1	0.333	0.22	Valid
X2.2	0.337	0.22	Valid
X2.3	0.495	0.22	Valid
X2.4	0.436	0.22	Valid
X2.5	0.690	0.22	Valid
X2.6	0.337	0.22	Valid
X2.7	0.053	0.22	Valid
X2.8	0.081	0.22	Valid
X2.9	0.082	0.22	Valid
X2.10	0.408	0.22	Valid
X2.11	1.000	0.22	Valid
X2.12	0.053	0.22	Valid
X2.13	0.081	0.22	Valid
X2.14	0.082	0.22	Valid
X2.15	0.408	0.22	Valid
Y.1	0.774	0.22	Valid
Y.2	0.394	0.22	Valid
Y.3	0.752	0.22	Valid
Y.4	0.420	0.22	Valid
Y.5	0.757	0.22	Valid
Y.6	0.628	0.22	Valid
Y.7	0.706	0.22	Valid
Y.8	0.750	0.22	Valid
Y.9	0.563	0.22	Valid
Y.10	0.811	0.22	Valid
Y.11	0.095	0.22	Valid
Y.12	0.420	0.22	Valid
Y.13	0.122	0.22	Valid
Y.14	0.095	0.22	Valid
Y.15	0.387	0.22	Valid

Source: Results of the questionnaire that has been processed by SPSS

Based on the table above, it is known that all question items in the questionnaire of the variables of Flight Operation and Engineering and On-time Performance are declared

valid, because all r-count items in each statement have a value of more than 0.22 so that 15 items of statements can be stated in the questionnaire of the variables of Flight Operation and Engineering to On-time Performance.

4.2 Reliability Test

The reason for using the Alpha Cronbach formula is that the results are more precise and can be closer to the actual results. In the Alpha Cronbach formula, the data is divided by the number of items. The greater the reliability coefficient obtained, the smaller the measurement error, the more reliable the measuring instrument will be.

On the other hand, the smaller the reliability coefficient, the greater the measurement error and the more unreliable the measuring instrument used is (Azwar, 2013, p. 83). The criteria for an item to be said to be reliable or reliable according to Ghozali (2005, p. 42) is > 0.6. In order to make the calculation easier, computational calculations will be used with the SPSS computer program version 25.

Table 2. Reliability Test Results

Variable	Cronbach's Alpha	Information
Flight Operation (X1)	0,762	Reliable
Engineering (X2)	0,771	Reliable
On-time Performance (Y)	0,779	Reliable

Source: Primary Data processing data with SPSS 27

Based on the table above, the value of Cronbach's Alpha for all variables X1, X2 and Y is greater than 0.60, thus it can be said that all variables used to see the relationship between Flight Operation and Engineering with *On-time Performance* are reliable and can be used for future testing.

4.3 Classical Assumption Test

Table 3. Classical Assumption Test Results

Test Type	Method Used	Criteria for Good Model	Result	Conclusion
Normality Test	Kolmogorov-Smirnov Test	Sig. > 0.05 indicates normally distributed residuals	Asymp. Sig. (2-tailed) = 0.200 > 0.05	Residuals are normally distributed
Multicollinearity	Tolerance & Variance Inflation Factor (VIF)	Tolerance > 0.10 and VIF < 10 indicate no multicollinearity	Flight Operation: Tolerance = 0.656; VIF = 1.524 Technique: Tolerance = 0.656; VIF = 1.524	No multicollinearity detected
Heteroskedasticity	Scatterplot (ZPRED vs. SRESID)	Random scatter without specific pattern indicates no heteroskedasticity	Scatterplot shows random distribution without clear pattern	No heteroskedasticity detected

Test Type	Method Used	Criteria for Good Model	Result	Conclusion
Autocorrelation	Durbin-Watson Test	dU < DW < 4–dU indicates no autocorrelation (n=78; k=2; dU=1.580; 4–dU=1.685)	DW = 0.893	No autocorrelation

Source: SPSS 27 output, processed by the authors (2024).

Based on the results presented in Table 4.18, the regression model in this study has met all the requirements of the classical assumption test. The normality test using the Kolmogorov-Smirnov method shows a significance value of 0.200, which is greater than 0.05, indicating that the residuals are normally distributed. The multicollinearity test demonstrates that all independent variables have tolerance values greater than 0.10 and VIF values below 10, suggesting the absence of multicollinearity. Furthermore, the heteroskedasticity test using a scatterplot indicates that the residuals are randomly distributed, confirming homoscedasticity. Finally, the autocorrelation test using the Durbin-Watson statistic (0.893) shows no indication of autocorrelation, as the value lies within the acceptable threshold. Hence, the regression model fulfills the classical assumption requirements and is suitable for further hypothesis testing.

4.4 Coefficient of Determination

Table 4. Determination Coefficient Result

Type	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,882a	,778	,772	5,38984

a. Predictors: (Constant), Technique, Flight Operation

The determination coefficient is used to calculate the magnitude of the influence or contribution of the free variable on the bound variable. From the analysis in the table above, the adjusted R^2 (determination coefficient) of 0.772 was obtained. This means that 77.2% of the On-time Performance variable will be influenced by the independent variables, namely Flight Operation and Engineering. Meanwhile, the remaining 22.8% of the On-time Performance variable will be influenced by other variables that are not discussed in this study.

4.5 Hypothesis Testing

Table 5. Hypothesis Testing Results (t-test and F-test)

Variable / Model	Coefficient (B)	Std. Error	Beta	t-value	Sig.	Decision
(Constant)	8.246	3.001	-	2.747	0.008	-
Flight Operation	0.364	0.129	0.400	2.825	0.006	Accepted
Technique	0.451	0.128	0.499	3.528	0.001	Accepted
Model (F-test)	-	-	-	131.516	0.000	Accepted

Dependent Variable: On-time Performance

Source: Primary Data Processed with SPSS 27

The results of the partial test (t-test) indicate that both independent variables have a statistically significant effect on On-time Performance. Specifically, the variable Flight Operation shows a positive and significant influence with a regression coefficient of 0.364 (t = 2.825; p = 0.006 < 0.05), confirming that improvements in flight operations enhance on-time performance. Similarly, the Technique variable demonstrates a stronger effect with a coefficient of 0.451 (t = 3.528; p = 0.001 < 0.05), indicating that technical factors significantly contribute to the improvement of on-time performance.

Furthermore, the simultaneous effect was assessed using the F-test. The results show that the overall regression model is highly significant (F = 131.516; p = 0.000 < 0.05). This finding suggests that both independent variables—Flight Operation and Technique—jointly influence On-time Performance in PT. Pelita Air. Therefore, the research model is appropriate and robust in explaining the variations in the dependent variable.

5. Conclusions

Based on the results of research and analysis that has been carried out at PT. Pelita Air regarding the influence of Flight Operation and Engineering on On-time Performance, several things can be stated that are the conclusions in this study are Based on the results of the test of the Flight Operation variable partially has a significant effect on On-time Performance PT. Pelita Air with a tcal value of (2.825) > ttable (1.668) and a Sig. value of 0.006 < 0.05 can be concluded that Ha is accepted and H0 is rejected which means that the Flight Operation variable in this study has a partial effect on On-time Performance and a regression coefficient value of (0.364) which illustrates that the Flight Operation variable has a positive influence on the On-time Performance variable. Based on the results of the test of technical variables, it partially has a significant effect on the On-time Performance of PT. Pelita Air with a tcal value of (3.528) > ttable (1.668) and a Sig. value of 0.001 < 0.05 can be concluded that Ha is accepted and H0 is rejected which means that the technical variable in this study has a partial effect on On-time Performance and a regression coefficient value of (0.451) which illustrates that the technical variable has a positive influence on the On-time Performance variable. Based on the results of the variable test, it shows that the variables Flight Operation and Engineering stimulatively have a positive and significant effect on On-time Performance with a value of Fcal of (131.516) > Ftable (3.2) and a value of Sig. 0.00 < 0.05, then it can be concluded that Ha is accepted and H0 is rejected which means that the variable Flight Operation, and Engineering in this study has a stimulating effect on On-time Performance which illustrates that the variables Flight Operation and Engineering have a positive influence on On-time Performance.

The suggestions in this research are expected by PT. Pelita Air needs to improve training and employee development in terms of Flight Operation and Engineering. This will help employees in understanding and applying modern technology and techniques that can improve the efficiency and speed of flight operations, PT. Pelita Air needs to invest in modern technology and techniques that can help improve efficiency and speed in the flight operations process. This will help reduce flight time and increase OTP, PT. Pelita Air needs to improve a good and effective flight preparation process. This will help avoid flight delays and increase customer satisfaction, PT. Pelita Air needs to improve coordination between departments, especially between operations and engineering departments. This will help ensure that all flight operations processes are carried out effectively and efficiently, PT. Pelita Air needs to conduct regular monitoring and

evaluation of performance to identify problems and areas that need improvement. This will help PT. Pelita Air in improving their performance and competitiveness in the global market.

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