THE ANALYSIS OF COMPLIANCE OF GROUND SUPPORT EQUIPMENT (GSE) PESONNEL TO FLIGHT SAFETY

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ABSTRACT

Sultan Hasanuddin International Airport Makassar is operated by PT Angkasa Pura I as the HUB of eastern Indonesia. By having heavy traffic, as an aviation service provider, it should provide excellent service and pay attention to safety and order, one of which is on the air side. Although there is already a Standard Operating Procedure (SOP) in place, there are still violations that occur, namely the lack of compliance of Ground Support Equipment (GSE) personnel with the implementation of Standard Operating Procedures (SOP). The purpose of this study is to determine the level of compliance of Ground Suppoprt Equipment (GSE) personnel and also to find out how to improve the compliance of Ground Support Equipment (GSE) personnel to comply with Standard Operating Procedures (SOP). This research uses quantitative descriptive methods with data collection techniques using observation, questionnaires and literature studies. The analysis method used is the Pearson product moment correlation method. The results of this study indicate that the compliance of Ground Support Equipment (GSE) personnel is still less compliant or not in accordance with Standard Operating Procedures (SOP), namely the unorderly placement of Ground Support Equipment (GSE), less compliant in turning on the rotary lamp when operating Ground Support Equipment (GSE) and there is still Foreign Object Debris (FOD) found on the Apron. And there is a relationship between compliance of Ground Support Equipment (GSE) personnel to flight safety as measured using the Pearson product moment correlation test of 0.9.

Keywords: *Compliance, GSE Personnel, Ground Support Equipment (GSE), Aviation Safety*

1. INTRODUCTION

Significant changes that occur in modes of transportation are supported by supporting infrastructure such as airports. The airport has a role as a place for switching modes of transportation. With the development of technology in the field of air transportation, now air transportation has a lot of enthusiasts because it is more time efficient and safer than other modes of transportation.

Airport management as an aviation service provider has an obligation to provide excellent service. Service excellence correlated with service quality is manifested in the performance results. Service excellence, through professional evaluations and performance outcomes, also indicates consumers' appreciation of a service provider's delivery on its promise [1]. One form of service provided by the airport is at the airside.

Sultan Hasanuddin Makassar International Airport is operated by PT. Angkasa Pura I as eastern Indonesia HUB. By having dense traffic, as an aviation service provider, it is supposed to provide excellent service and pay attention to safety and order, one of which is on the air side.

PT Angkasa Pura I as one of the State-Owned Enterprises (BUMN) engaged in airport services. There are 15 airports under the auspices of PT Angkasa Pura I, most of which are in the central and eastern parts of Indonesia. Makassar Sultan Hasanuddin International Airport is one of the airports managed by PT Angkasa Pura I. This airport is the main gateway for air transportation to the eastern part of Indonesia. Seeing the role of airports that are so broad, airport management is very important in providing services to the community

In order to maximize existing services at the airport, especially at the airside. So the need for aircraft ground service support equipment (Ground Support Equipment / GSE). To operate it requires service by Ground Support Equipment (GSE) personnel. Ground Support Equipment (GSE) is auxiliary equipment prepared for the needs of aircraft and passengers on the ground upon arrival and/or departure, loading and/or unloading of passengers, cargo and post [2] [3] [4] [5].

Of course, these personnel must carry out the appropriate Standard Operating Procedures (SOP). In addition, the personnel must also have a license and are experts, because it is closely related to the safety and security of aircraft operations. As activity increases on the air side, it is necessary to increase supervision carried out by the Apron Movement Control (AMC) unit.

For example, supervision of Ground Support Equipment (GSE) personnel regarding the placement of

Ground Support Equipment (GSE) equipment that affects safety at an airport. Flight safety is undoubtedly the most important requirement for modern aircraft design and operation [6] [7] [8].

Even though there are Standard Operating Procedures (SOP) in force, violations are still found, namely the lack of compliance of Ground Support Equipment (GSE) personnel with the implementation of Standard Operating Procedures (SOP). This can affect the level of flight safety.

Ground Support Equipment (GSE) equipment, namely the Belt Conveyor Loader (BCL) which was not returned to the staging area after use, was found in several violations at Sultan Hasanuddin International Airport Makassar. And also an empty baggage chart that was not immediately removed and is still on the Apron side.

Apart from the lack of compliance in the placement of Ground Support Equipment (GSE), there is Foreign Object Debris (FOD). FOD is regularly used to depict any little thing, molecule, or garbage that doesn't have a place on an air terminal asphalt surface, and has the capacity to make mischief or harm an airplane that cruises by [9]. The FOD found was in the form of pieces of paper on the side of the Sultan Hasanuddin Makassar International Airport Apron. This condition can occur if the personnel do not apply the appropriate Standard Operating Procedures (SOP).

Accidents and incidents are something that cannot be avoided in the world of work. Therefore, it is necessary to improve the supervision and traffic rules of movement on the Apron, the addition of CCTV to optimize supervision, and the application of sanctions to violators of rules and regulations of driving on the air side.

Based on the description above, the authors are interested in conducting research to determine the level of compliance of Ground Support Equipment (GSE) personnel with the following problem formulation:

1. What is the level of compliance of Ground Support Equipment (GSE) personnel with the implementation of Standard Operating Procedures (SOP) on the Apron side of Sultan Hasanuddin Makassar International Airport?
2. Is there a relationship between Ground Support Equipment (GSE) personnel compliance with aviation safety?

2. METHOD

2.1 Research Design

This research design uses an evaluation approach. Research through an evaluation approach is part of the decision-making process, namely to compare an event, activity, product with predetermined standards and programs that serve to explain a phenomenon. Thus the method used is descriptive method quantitative [10].

Quantitative research usually involves systematic and empirical investigation of phenomena through statistics and mathematics and the processing of numerical data by definition [11]. The process of estimating numbers in quantitative research provides the fundamental link between empirical observation and mathematical expression of quantitative relations.

Based on the introduction described above, this study uses a quantitative approach to analyze the compliance of Ground Support Equipment (GSE) personnel (X) with flight safety at Sultan Hasanuddin Makassar International Airport (Y). The author uses independent variables and dependent variables that are not expressed in numerical form. The dependent variable is the variable that is explained and influenced by the independent variable. The independent variable is the variable that influences or causes the change or the emergence of the dependent (bound) variable and the dependent variable is the variable that is affected or becomes the result, because of the independent variable [12] [13] [14].

The population in this study were 30 airport operations airside people at Sultan Hasanuddin Makassar International Airport. Population is the whole group of individuals, groups, or objects around which you want to generalize the results of your research [15]. Sample is a portion of the population. In this study the authors used saturated sampling technique [16]. Sampling technique is a sample selection technique when all members of the population are sampled according to saturation [17]. In this study, questionnaires will be distributed to 30 respondents. These respondents are from 30 people from airport operations airside at Sultan Hasanuddin Makassar International Airport.

The object of research is the purpose of obtaining data [18]. In this research, the object of research is Ground Support Equipment (GSE) personnel and Ground Support Equipment (GSE) personnel compliance levels.

The author uses data collection techniques by means of observation, distribution of questionnaires and literature study. Observation aims to describe the setting studied, the activities that take place, the people involved in the activity, and the meaning of the event seen from the perspective [19].

The author conducts field observations related to the Compliance Analysis of Ground Support Equipment (GSE) Personnel on Aviation Safety at Sultan Hasanuddin International Airport Makassar. Where the hope of this observation will provide results that Ground Support Equipment (GSE) Personnel Compliance is very influential on flight safety. So that in the future Ground Support Equipment (GSE) personnel can be more compliant with Standard Operating Procedures (SOP) in carrying out operational activities.

Questionnaire is a data collection technique that is carried out by giving a set of questions or written statements to respondents to answer [20]. The questionnaire method that the author took aims to obtain information that is relevant to the author's problems. In this study, I distributed questionnaires via gform to 30 respondents from airport operations airside at Sultan Hasanuddin International Airport, Makassar. The questionnaire used is a statement regarding the level of compliance of Ground Support Equipment (GSE) personnel with aviation safety.

Literature study is all efforts made by researchers to collect information that is relevant to the topic or problem to be or is being researched [21]. And literature study is a data collection technique by conducting a review study of books, literature, records, and reports that have to do with the problem being solved [22].

2.2 Data Analysis Techniques

2.2.1 Validity test

According to the validity test is intended to determine the level of accuracy of the measuring instrument (instrument) used in measuring the variables being measured. How to test the validity can be done with the Pearson product moment correlation formula, with a significant level of 0.05. Questionnaire items in the validity test are said to be valid if r count > r table at a significant level of 0.05 (0.361) [23]. If the value of r ≥ 0.361 then the data is valid. Validity can also be known from the significant correlation results, if the significant correlation results are less than 0.05, then the test is a

construct of the results of testing the validity of a strong research instrument.

2.2.2 Reliability Test

Next, the reliability test was carried out. Reliability is an index that shows the extent to which a measuring instrument has a coefficient greater than 0.361, in collecting data it is declared reliable. If Cronbach's Alpha value > R table then the questionnaire or questionnaire is declared reliable or consistent. Meanwhile, if the value of Cronbach's Alpha <R table then the questionnaire or questionnaire is not reliable [24].

2.2.3 Correlation Test

Correlation test using Pearson's product moment correlation [25]. The Pearson product moment correlation, or with the symbol (r), is the most popular and often used by students and researchers. This correlation was put forward by Karl Pearson in 1900. The function of this correlation is to determine the degree of relationship and contribution of the independent variable to the dependent variable. The Pearson product moment correlation analysis technique includes parametric statistical techniques that use interval and ratio data with certain requirements.

For example, when the data is selected randomly, then the data is normally distributed, the correlated data has a linear pattern and the correlated data has the same pair corresponding to the same subject. If all of these conditions are met, then this correlation can be used, but if one of them is not met, then this analysis cannot be done.

Correlation test using Pearson product moment correlation. Decision making is if r count is greater than r table then it can be said that there is a relationship. Meanwhile, if the r count is smaller than the r table, it can be concluded that there is no relationship.

3. RESULTS AND DISCUSSION

3.1 Results

The primary data used in this research is observation. Primary data is a description of the actual characteristics in the field [26]. Data is a collection consisting of facts to provide a broad picture related to a situation. Through this data one can analyze, describe, or explain a situation.

The author conducted field observations related to the Compliance Analysis of Ground Support Equipment (GSE) Personnel on Aviation Safety at Sultan Hasanuddin International Airport, Makassar. Where the hope of this observation will give the result that Ground Support Equipment (GSE) Personnel Compliance is very influential on flight safety. So that in the future Ground Support Equipment (GSE) personnel can comply more with Standard Operating Procedures (SOP) in carrying out operational activities.

According to field observations, the authors found several violations, such as Ground Support Equipment (GSE) personnel who did not turn on the rotary lamp when operating Ground Support Equipment (GSE), exceeded the driving speed limit on service roads, did not place BTT back after use, placed Ground Support Equipment (GSE) along the service road after use and lack of awareness from Ground Support Equipment (GSE) personnel about the dangers of Foreign Object Debris (FOD).

In Chapter V: Article 33 it is stated that "All vehicles and other equipment used for aircraft services, must be immediately moved or removed or stored in a place or room that has been provided after the aircraft served departs". Article 52 paragraph 3 states that "Equipment that is not in use should be arranged in an orderly manner in the space provided" [27].

There are several forms of violations committed by Ground Support Equipment (GSE) personnel that are not in accordance with the Standard Operating Procedures (SOP). One of the forms of this violation is the lack of

order in the placement of Ground Support Equipment (GSE) in the Apron area of Sultan Hasanuddin Makassar International Airport.

Based on the observations made by the author in the field, it was found that the Belt Conveyor Loader (BCL) equipment was not returned to the staging area after being used. Belt Conveyor Loader (BCL) is placed at parking stand B11. This can pose risks such as slowing down Ground Time so that delays in aircraft service can occur. This happened because Ground Support Equipment (GSE) personnel did not carry out their work in accordance with Standard Operating Procedures (SOP).

And also the author encountered a violation in the form of Ground Support Equipment (GSE) personnel who did not turn on the rotary lamp when operating a Ground Support Equipment (GSE) vehicle. In addition to the lack of personnel awareness of the existence of Foreign Object Debris (FOD), FOD poses a danger if it is sucked into the engine, both dangerous for flights and dangerous for humans.

The author conducted field observations related to the Compliance Analysis of Ground Support Equipment (GSE) Personnel on Aviation Safety at Sultan Hasanuddin International Airport, Makassar. Where the hope of this observation will give the result that Ground Support Equipment (GSE) Personnel Compliance is very influential on flight safety. So that in the future Ground Support Equipment (GSE) personnel can comply more with Standard Operating Procedures (SOP) in carrying out operational activities.

In this study, the Apron Movement Control (AMC) unit plays a very important role in monitoring the airside side which is related to flight safety. Some of the roles of the Apron Movement Control (AMC) unit is to carry out training for equipment/vehicle and aircraft personnel on the Apron and carry out supervision and order of traffic movements on the Apron [28].

Supervision is carried out to avoid violations that can lead to unwanted incidents and accidents. And the need to comply with Standard Operating Procedures (SOP) which also affects the smooth movement of aircraft in the Apron area.

One of the causes of violations of Ground Support Equipment (GSE) personnel compliance is the lack of supervision from the Apron Movement Control (AMC) unit caused by a lack of Human Resources (HR) for the Apron Movement Control (AMC) unit which is still not in accordance with the PT AMC Manual. . Angkasa Pura 1 Manual of Standard, Airside Safety Manual Version 1.0. This causes Ground Support Equipment (GSE) personnel to become less compliant due to less optimal performance due to the limited number of Human Resources (HR).

Data research method by distributing questionnaires to respondents from 30 airport operations airside at Sultan Hasanuddin Makassar International Airport. The distribution of this questionnaire uses the Google Form media and is filled in by respondents to each question which according to the respondent is the most appropriate.

The following below is the result of the total index of each variable:

Index Calculation Recapitulation			
questionnair	variable index X	questionnair	variable index Y
1	90%	6	90%
2	88,3%	7	90,8%
3	87,5%	8	89,1%
4	88,3%	9	88,3%
5	90%	10	89,1%

Figure 1. Index Calculation Recapitulation

By using the calculated r value of 0.361, valid results are obtained. The results show that the value of r calculated for all questions is greater than r table 0.361. Thus it can be concluded that all items are declared valid and the questionnaire in this study can be used for further analysis.

Next is the reliability test with the condition that if the value of Cronbach's Alpha > R table then the questionnaire or questionnaire is declared reliable or consistent. Meanwhile, if the value of Cronbach's Alpha <R table then the questionnaire or questionnaire is not reliable.

Test Criteria		
Reference value	*Cronbach's Alpha value*	Conclusion
0.361	0.655	reliabel

Figure 2. Reability Test

Based on the table above, the results of data processing are considered reliable because the Cronbach'c Alpha value is above 0.361 (0.655> 0.361).

Correlation test using Pearson product moment correlation. Decision making is if r count is greater than r table then it can be said that there is a relationship. Meanwhile, if the r count is smaller than the r table, it can be concluded that there is no relationship.

X	Y	XY	X^2	Y^2
108	108	11664	11664	11664
106	103	10918	11236	10609
105	107	11235	11025	11449
106	106	11236	11236	11236
108	107	11556	11664	11449
533	**531**	**56609**	**56825**	**56407**
Σx^2	56825			

$(\Sigma x)^2$	284089			
Σy^2	56407			
$(\Sigma y)^2$	281961			
$\Sigma x \Sigma y$	283023			
Σxy	56609			
r xy	0.9999			
r table	0.361			
conclusion	there is a relationship			

Figure 3. Correlation Test

Based on the picture of the correlation test results above using the Pearson product moment correlation. The Pearson correlation coefficient is 0.99 and for the r table is 0.361. Then 0.99> 0.361, explaining that the two variables have a relationship. The level of relationship between the two variables is included in the very strong category. So the accepted hypothesis is H1, that is, there is an influence of Ground Support Equipment (GSE) personnel compliance on flight safety at Sultan Hasanuddin Makassar International Airport.

3.2 Discussions

The discussion on the analysis of the compliance of Ground Support Equipment (GSE) personnel to aviation safety aims to answer the formulation of the problem and the research hypothesis which states that the level of compliance of Ground Support Equipment (GSE) personnel affects flight safety at Sultan HJasanuddin International Airport Makassar. The variables used consist of the x variable, namely Ground Support Equipment (GSE) personnel compliance and for the y variable, flight safety.

Discussion regarding the relationship between Ground Support Equipment (GSE) personnel compliance and aviation safety based on the results of the reliability test obtained a value of 0.655. If the value of Cronbach's Alpha > R table then the questionnaire or questionnaire is declared reliable or consistent (0.655> 0.361).

The discussion on the analysis of the compliance of Ground Support Equipment (GSE) personnel to aviation safety aims to answer the formulation of the problem and the research hypothesis which states that the level of compliance of Ground Support Equipment (GSE) personnel affects flight safety at Sultan Hasanuddin International Airport Makassar. The variables used consist of the x variable, namely Ground Support Equipment (GSE) personnel compliance and for the y variable, flight safety.

The discussion regarding the relationship between Ground Support Equipment (GSE) personnel compliance and aviation safety based on test results with Pearson's product moment showed a result of 0.99. Explains that the two variables have a relationship. The level of relationship between the two variables is included in the very strong category.

4. CONCLUSION

Based on the discussion in the writing above, it can be concluded as follows:

1. In questionnaire number 2 regarding Ground Support Equipment (GSE) personnel who have not been orderly in placing Ground Support Equipment (GSE) equipment/vehicles, they get a total score of 88.3%, which means that respondents strongly agree that there are still violations committed by Ground Support Equipment (GSE) personnel.) related to the lack of orderly placement of Ground Support Equipment (GSE) equipment/vehicles.
2. In questionnaire number 4 regarding Ground Support Equipment (GSE) personnel who are not obedient in turning on the rotary lamp when operating the Ground Support Equipment (GSE) they get a score of 88.3%, which means that the respondent strongly agrees with this statement.
3. In questionnaire number 5 regarding the presence of Foreign Object Debris (FOD) found on the Apron, a score of 90% means that respondents strongly agree if Foreign Object Debris (FOD) is still found on the Apron.
4. The level of compliance of Ground Support Equipment (GSE) personnel with the implementation of Standard Operating Procedures (SOP) on the Apron side of Sultan Hasanuddin Makassar International Airport is that they are not compliant or not in accordance with the Standard Operating Procedures (SOP), that is, the laying of Ground Support Equipment (GSE) in an orderly manner the total index for variable X is 88.3%, the disobedience in turning on the rotary lamp when operating Ground Support Equipment (GSE) with the total index for variable X is 88.3% and there is still Foreign Object Debris (FOD) found on Apron with a total index for variable X that is equal to 90%.
5. Validity test using excel shows that each variable produces a validity coefficient number that is more than 0.361 ($r > 0.361$). Thus, it can be stated that the data collection instrument used in this study is valid.
6. The reliability test using excel shows that the value of Cronbach's alpha > r table is 0.655 > 0.361. This shows that the results of data processing are considered reliable.

7. The correlation test using the Pearson product moment shows that the Pearson correlation coefficient is 0.9 which is where the decision is made if r count is greater than r table then it can be said that there is a relationship. The Pearson correlation coefficient is 0.99 for r table 0.361, explaining that the two variables have a very strong relationship.

Suggestions for Ground Support Equipment (GSE) personnel in order to increase compliance in accordance with Standard Operating Procedures (SOP), namely by paying more attention to security in carrying out their duties in accordance with the first lowest total index for variable Y, which is equal to 88.3%, then by carrying out routine maintenance towards Ground Support Equipment (GSE) equipment and participating in training and selfdevelopment related to duties as Ground Support Equipment (GSE) personnel according to the total index for the second lowest variable Y, which is equal to 89.1%. It also requires cooperation with Apron Movement Control (AMC) personnel regarding strict supervision in the airside area in accordance with Standard Operating Procedures (SOP).

REFERENCES

[1] H. Tseng Lung and L. Shuling, "A model of acceptance of augmented-reality interactive technology: the moderating role of cognitive innovativeness. Electronic Commerce Research," *Electronic Commerce Research,* pp. 269-295, 2015.

[2] L. Sznajderman, M. Coppa, J. Martiarena and O. Oscar Díaz, "Quantification model of airport ground support equipment emissions," *Aviation,* pp. 195-208, 2022.

[3] D. Alonso Tabares and F. Mora-Camino, "Aircraft ground handling: analysis for automation," *In 17th AIAA Aviation Technology, Integration, and Operations Conference,* p. 3425, 2017.

[4] C. E. Billings, "Aviation automation: The search for a human-centered approach," *CRC Press,* 2018.

[5] M. Alruwaili and L. Cipcigan, " Airport electrified ground support equipment for providing ancillary services to the grid," *Electric Power Systems Research,* p. 211, 2022.

[6] Y. Cao, W. Tan and Z. Wu, "Aircraft icing: An ongoing threat to aviation safety," *Aerospace science and technology,* pp. 353-385, 2018.

[7] R. Bogdane, O. Gorbacovs, V. Sestakovs and I. Arandas, "Development of a model for assessing the level of flight safety in an airline using concept of risk," *Procedia Computer Science,* pp. 365-374, 2019.

[8] L. Zhe, X. Haojun and X. Yuan, "Aircraft icing: An ongoing threat to aviation safety," *Aerospace science and technology,* pp. 353-385, 2018.

[9] T. Chauhan, C. Goyal, D. Kumari and A. Kumar Thakur, " A review on foreign object debris/damage (FOD) and its effects on aviation industry," *Materials Today: Proceedings,* pp. 4336-4339, 2020.

[10] L. Rochmawati, F. Fatmawati, M. MaharaniSukma and I. Sonhaji, "Online learning motivation for Aviation English: Attitude, readiness, and demographic factors," *J. Eng. Educ. Society 6:1.doi: 10.21070/jees.v6i1.792,* 2021.

[11] N. Basias and Y. Pollalis, "Quantitative and qualitative research in business & technology: Justifying a suitable research methodology," *Review of Integrative Business and Economics Research,* pp. 91-105, 2018.

[12] N. Ridha, "Proses penelitian, masalah, variabel dan paradigma penelitian," *Hikmah,* pp. 62-70, 2017.

[13] R. Ulfa, "Variabel Penelitian Dalam Penelitian Pendidikan," *Al-Fathonah,* pp. 342-351, 2021.

[14] J. Jufrizen and T. Safani Sitorus, " Pengaruh Motivasi Kerja dan Kepuasan Kerja Terhadap Kinerja Dengan Disiplin Kerja Sebagai Variabel Intervening," *In Seminar Nasional Teknologi Edukasi Sosial dan Humaniora,* vol. 1, pp. 844859, 2021.

[15] I. Ketut Swarjana and S. M, Populasi-sampel, teknik sampling & bias dalam penelitian, Andi, 2022.

[16] M. Ramdha, Metode penelitian, Cipta Media Nusantara, 2021.

[17] Sugiyono, "Metode Penelitian Pendidikan (Kuantitatif, Kualitatif, Kombinasi, R&d dan Penelitian Pendidikan)," *Metode Penelitian Pendidikan,* p. 67, 2019.

[18] H. Umar, Metode penelitian untuk tesis dan bisnis, Jakarta: Grafindo Persada, 2005.

[19] Bungin, "Penelitian Kualitatif: Komunikasi, Ekonomi, Kebijakan Publik, dan Ilmu Sosial Lainnya," vol. 2, 2007.

[20] Sugiyono, "Metode Penelitian Kuantitatif, Kualitatif, dan R&D," *Alfabeta,* 2007.

[21] A. Azizah, "Studi kepustakaan mengenai landasan teori dan praktik konseling naratif," *Doctoral dissertation, State University of Surabaya,* 2017.

[22] M. Nazir, Metode Penelitian (G. Indonesia (ed.)), Ghalia Indonesia, 1988.

[23] B. Darma, Statistika Penelitian Menggunakan SPSS (Uji Validitas, Uji Reliabilitas, Regresi Linier Sederhana, Regresi Linier Berganda, Uji t, Uji F, R2), Guepedia, 2021, pp. 10-16.

[24] I. Novikasari, "Uji Validitas Instrumen," *Purwokerto: Institut Agama Islam Negeri Purwokerto,* vol. 56, 2016.

[25] A. Wijayanto, "Analisis Korelasi Product Moment Pearson," 2008.

[26] R. Pratiwi, R. S.DJ and K. P, "Perbandingan Potensi Berat dan Volume Lumpur yang Dihasilkan oleh IPA Badak Singa PDAM Tirtawening Kota Bandung Menggunakan Data Sekunder dan Primer," *Jurnal Reka Lingkungan,* pp. 30-40, 2015.

[27] Direktorat Jenderal Perhubungan Udara, SKEP/100/XI/1985 tentang Peraturan dan Tata Tertib Bandar Udara, Menteri Perhubungan Republik Indonesia, 1985.

[28] Peraturan Direktur Jenderal Perhubungan Udara Nomor KP 326 Tahun 2019 tentang Standar Teknis dan Operasional Peraturan Keselamatan Penerbangan Sipil, 2019.