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State Defense Perspective: Disaster Risk Analysis of Air Transportation Accidents

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Article Info

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Abstract

The aim of this study was to analyse disaster risk of air transportation accidents in the national defense system perspectives and also the efforts of airport authority to manage the risk. A qualitative, narative and exploratory study was developed using risk management ISO 31000 as a method to analyse data. Interview, literature study and documentation were done to collect data. This study used purposive sampling to decide informants. It was found that Halim Perdanakusuma International Airport had a high risk in air transportation accidents. To keep the stability of national defense, the risk had to be managed through structural mitigation and non-structural mitigation.

Penelitian ini bertujuan menganalisis tingkat risiko bencana kecelakaan transportasi udara dalam perspektif pertahanan negara serta upaya yang ditempuh Otoritas Bandara Internasional Halim Perdanakusuma dalam mengurangi risiko tersebut. Penelitian yang dilakukan menggunakan metode penelitian kualitatif dengan pendekatan naratif. Pengumpulan data dilakukan dengan studi kepustakaan, wawancara dan dokumentasi. Pemilihan informan menggunakan teknik purposive sampling, sedangkan teknik analisis data menggunakan metode risk assessment ISO 31000. Hasil penelitian menunjukkan bahwa Bandara Internasional Halim Perdanakusuma mempunyai tingkat risiko bencana kecelakaan transportasi udara yang tinggi, sehingga untuk menjaga stabilitas pertahanan negara tingkat risiko yang tinggi harus diturunkan melalui mitigasi structural dan mitigasi non struktural.

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Introduction

Air transportation in Indonesia is growing rapidly marked by a considerable growth passenger's rate, which is at the rate of 10 to 15 percent per year (Hakim, 2010). Indonesian state conditions have limitations in the provision of air transport facilities and infrastructure cause used military air bases for private airlines or commercial operation. Therefore, the government regulates civil aviation from various safety and security issues (Yates & Srinivasan, 2014).

The study of security issues became securitization theory focus as main critical approach in security studies (Maltman 2013), showed political impact of securitization (Salter & Piché 2011). Empirical studies of securitization have been used for empirical studies in various fields (Huysmans 2006), border security (Salter & Piché 2011), piracy (Vreŷ 2011), terrorism (Buzan 2006), transnational crime (Williams 2008) and natural disasters (Hyndman 2007), civil aviation security (Salter 2008).

The civil aviation safety system according to (Clinch & Healy, 2001; Martínez, 2011; Blomberg et al., 2012; Wu et al., 2012) consists of various sources such as input, operation and final output. To evaluate the safety of civilian borders, some researchers focus on target security levels (Li et al., 2009), identification systems (Persing & Ng, 2009), civil aviation safety performance (Chen, 2010), security changes in the civil aviation industry Lofquist, 2010), aviation risk assessment (Brooker, 2011), and the safety climate (Conner et al., 2011). While the factors affecting the safety of civil aviation (Cui & Li, 2015) consist of passenger perceptions (Chang and Liao, 2008), aviation safety education (Chang & Liao, 2009), human error (Chen et al., 2009).

However, in this kind of transportation development are often faced with many risks, so it needs more in-depth analysis of disaster risk airfield/airports considering the disaster caused by air transport accidents can cause material losses and great casualties. Several recent accidents, can be seen in Table 1

Air transport should receive special attention in the aspect of

security, in addition to aircraft accidents are always casualties, aircraft are particularly vulnerable when faced with the slightest negligence (Hakim, 2010).

The existence of two institutions namely Halim Perdanakusuma Airbase and Halim Perdanakusuma International Airport using one airstrip in Halim Perdanakusuma, can cause greater vulnerability potential and if faced with the danger will be a catastrophic risk of air transport accidents. The problems would arise include:

First, air traffic density/crowded flight. ***Second,*** increasing population and building tall can be a hindrance at the time of take off and landing aircraft. ***Third,*** should the airport ideal location in the suburb bordering the beach and away from mountainous areas or far away from high buildings. The layout and position of airport development is sought to consider wind direction, humidity level, rainfall and lightning (Fathoni, 2014). ***Fourth,*** the airport management to regulate Flight Operations Safety Area (Indonesia: Kawasan Keselamatan Operasi Penerbangan (KKOP)). The joint use of airfield between Halim Perdanakusuma Airbase and Halim Perdanakusuma International Airport, requires synergy in airport management. On April 22, 2016 at 15:00 WIB (Hakim, 2016) found the Foreign Object Damage (FOD) on the runway Halim Perdanakusuma in the form of dirt from the exfoliation of the runway asphalt layer.

This research is important to provide recommendations to relevant stakeholders at the Halim Perdanakusuma International Airport Area, as one of the efforts to reduce the risk of air transport accident disasters. In addition, to assist the development of disaster risk management science, especially air transport accidents

Table 1. Risk of Air Transport Accident at Halim Perdana Kusuma Airport

No	Airlines	Incident Year	Information
1	Wings Air	October 21, 2016	Wings Air plane has failed the system of hydraulic loss to Parking Stand A3, almost hit the Headset man and stopped after crashing BTT Batik Air vehicle

No	Airlines	Incident Year	Information
2	Nusantara Air Charter	September 25, 2016	The Learjet PK-JKI plane crashed on the Halim runway at 19.50 WIB.
3	Runway Halim PK	April 22, 2016	Found Foreign Object Damage (FOD) on the runway Halim Perdanakusuma in the form of dirt that comes from the peeled asphalt runway may endanger aircraft take off and landing.
4	Batik Air & Pelita Air	April 20, 2016	Aircraft Batik Air and Pelita Air are together a taxi on Runway 24. Pelita Air will carry out take off while Batik Air plane will cross the runway to / from the parking area.
5	Batik Air & Trans Wisata	April 7, 2016	The Batik Air plane canceled the landing on Runway 24 and flew again to an altitude of 2500 feet, almost colliding with the current Trans Wisata plane, waiting its turn to land at the same height at 2500 feet.
6	Batik Air & Trans Nusa	April 4, 2016	Batik Air and Trans Nusa aircraft collided at Halim Airport.
7	Air Force	June 21, 2012	Fokker 27 crashed in a residential complex of airstrips

Source: Monthly Reports of Halim Perdanakusuma Airport Safety Service, 2016

Method

Type of research conducted using qualitative research with narrative approach (Creswell, 2016). The study was conducted to find out the description of disaster risk level of air transport accidents and efforts made to reduce risk

Data collection techniques used in this research is triangulation techniques (Sugiyono, 2014). With triangulation techniques we examined data credibility, testing credibility of data will be applied to risk Halim Perdanakusuma International Airport. Testing credibility of data is intended to check data from various sources. From a number of data sources will be described, categorized participants' view of same or different. The data are then analyzed and conclusion.

Researchers used a method of risk assessment / risk assessment ISO 31000 in analyzing the data with the identification, analysis and evaluation of risks Halim

Perdanakusuma International Airport. The researcher summarizes the data obtained in the field, chooses important issues, then identifies factors that may affect the risk of air transport accident disasters.

The data that has been identified to be restated in the form of a narrative/qualitative reports, analyzed the likelihood and impact of risk factors have been identified. Determination of criteria for the likelihood and impact of risks based on data obtained in the field. The results of the risk analysis are then compared with the risk criteria to determine how risk management at Halim Perdanakusuma International Airport.

Result and Discussion

Risk Identification

In this research we have identified the risks of air transport accidents disaster at Halim Perdanakusuma International Airport, which are:

(1) Runway and light navigation, (2) Weather, (3) Obstacle, (4) Wildlife and Foreign Object Damage (FOD), (5) Electrical installation, (6) Taxiway, (7) Air traffic density, (8) Density of communication channel, (9) Population density, (10) Laser light interference, (11) Airport maintenance budgets, (12) Ticket price competition, and (13) Burning garbage

Risk Analysis

Based on the results of risk identification can be seen that there is a risk of air transport accident disasters. From the data obtained through interviews and document sources Halim Perdanakusuma International Airport can be known how the risk level. In Table 2 shows the level of possible risk / probability (P) as well as their impact / severity (S). According to the ICAO Safety Management Manual (2013), risk assessment criteria as follows:

Table 2 Disaster Intensity Scale

No	Risk Factor	P	S
1	Runway and light navigation	5	A
2	Weather	5	B
3	Obstacle	4	B
4	Wildlife and Foreign Object Damage (FOD)	3	D
5	Electrical installation	4	B

No	Risk Factor	P	S
6	Taxiway	4	A
7	Air traffic density	5	A
8	Density of communication channel	5	A
9	Population density	3	D
10	Laser light interference	4	C
11	Airport maintenance budgets	4	C
12	Ticket price competition	3	D
13	Burning garbage	4	D

Source: Research Results, 2017

After all risk factors are included in Table 2, each risk is then assessed in accordance with the criterion of impact (S) and possible criterion (P). The results obtained will be grouped according to the Risk Index score to determine the risk disaster level. Table 3 shows that some risk factors are still in high probability and impact criteria, namely: runway and light navigation conditions, air traffic density, density of communication channel, Weather, Electrical installation, taxiway, obstacle. Based on the risk assessment index in Table 3 this criterion enters at a high level of disaster risk. Other risk factors, namely: laser light interference, airport maintenance budgets wildlife and (fod), waste incineration, population density, competition ticket corresponding risk assessment index, including at moderate levels.

Table 3 Risk Index

Risk Assessment Index	Risk Ranking	Proposed Criteria
5A, 5B, 5C, 4A, 4B, 3A	**High**	Unacceptable to existing conditions
5D, 5E, 4C, 4D, 4E, 3C, 3D, 2A, 2B, 2C, 1A, 1B	**Medium**	Risk / mitigation control requires management decisions. Acceptable after reviewing the operation
3E, 2D, 2E, 1C, 1D, 1E	**Low**	Acceptable

Source: Safety Management Manual ICAO, 2013

Risk Evaluation

Based on Table 4 Expected Risk Index and Tables Risk Assessment Matrix in Table 3 then there are some risk factors were high at Halim Perdanakusuma International Airport. This condition is not in accordance with Table Risk

Index, so it must be action to make improvements technically and administration so that the risk factors in high-risk areas can be dropped at moderate risk areas. Then it can be in accordance with Table 4 Expected Risk Index.

Table 4 Expected Risk Index

Risk Assessment Index	Risk Ranking	Proposed Criteria
-	**High**	Unacceptable to existing conditions
5A, 5B, 4A, 4B,4C, 4D, 3D,	**Medium**	Risk / mitigation control requires management decisions. Acceptable after reviewing the operation
-	**Low**	Acceptable

Source: Safety Management Manual ICAO, 2013

Analysis of Air Transportation Accident Disaster Risk in National Defense Perspective

Halim Perdanakusuma International Airport is a strategic national valuable object, this is in accordance with Law No.34 of 2004 on Indonesian National Army article 7, explaining that the national vital objects are objects concerning people's livelihood, prestige and dignity of the nation, and national interests are determined by government decree.

Halim Perdanakusuma International Airport operates in the Military Air Force Base causing high vulnerability and hazard to military operations, if not managed with proper management will have an impact on the state defense because in Halim Perdanakusuma Air Base there are operating units that require flexibility, speed as well as secrecy in its movement.

The operational units at Halim Perdanakusuma Air Base include the National Air Defense Command (Indonesia: Komando Pertahanan Udara Nasional (Kohanudnas)), Air Force Operations Command II (Indonesia: Komando Operasi Angkatan Udara II (Koopsau II)), 3 Air Squadron, 2 Command Battalions of Paskhas and 2 Paskhas Detachments.

This condition should be given priority to disaster management

through mitigation, prevention and increasing airport capacity. Law No 1 of 2009 Article 257 on Aviation had given orders that the airport must provide flight operational support to country both in times of peace, emergency, or war.

State of Peace Condition

In a state of peace, Halim Perdanakusuma International Airport should be able to provide facilities and security to increase state revenues. Figure 1 shows Apron Halim Perdanakusuma International Airport is full of commercial aircraft parking.

With the increase of flight service users at Halim Perdanakusuma International Airport will increase the revenue that is deposited into the state treasury. Based on the annual report Angkasa Pura increase substantial income.

Figure 1. Apron Halim Perdanakusuma International Airport (Source: Researcher Document, 2016)

Halim Perdanakusuma International Airport should be able to evaluate airport management so that in peaceful condition must be able to provide maximum state revenue and synergize with state defense interests as main priority.

State of Emergency Condition

Now, the country has several times to face emergencies in the face

of natural disasters and non-natural (non-military) than military threat. Halim Perdanakusuma Airbase as the Air Force Base of Indonesian Air Force in Jakarta, became the center of crisis-prevention operations (crisis center) of the Indonesia western part incorporated in the Rapid Response Unit for Disaster Response (Indonesia: Satuan Reaksi Cepat Penanggulangan Bencana (SRCPB)).

Halim Perdanakusuma Air Base which became a crisis center experienced a high activity because the movement of logistic aid distribution both from domestic and abroad is mostly charged at Halim.

Air traffic density conditions at Halim Perdanakusuma International Airport complicate the handling of logistics distribution and personnel support whereas if a number of flights are diverted suddenly will cause new problems. Therefore, required doctrine of Air Power as the air force used media heights. In military operations, Air Power has special characteristics to be used in disaster management.

The advantages of Air Power are: (1) Height; used to location search of plane crash wider visually better than on land and sea, (2) Speed; disaster management requires rapid movement during emergency response, (3) Reachability; able to penetrate difficult terrain to reach, (4) Flexibility; air power could be used for military operations and other operations including disaster relief operations, (5) Power breaks through; able to break through areas that have natural barriers and obstacles so can open access to more help coming, (6) Responsiveness; Air power can respond quickly in emergency response, (7) Powers center; This capability can be used as a command center in Disaster management during emergency response and post-disaster governing strategic and tactical movement mechanism, (8) High mobility; Air power can be deployed quickly to be projected on a particular target.

State of War Conditions

There are two possibilities that can occur, the emergence of cooperation or conflict. If what is done is cooperation will not affect the defense and security of the country, but if it is created is a conflict, it will

certainly affect defense and security of country (Supriyatno, 2016).

Halim Perdanakusuma Airbase as one of the air force is the base becomes preparation of military operations, this preparation area will serve as a distribution of potential power of war, ammunition and rendefu or concentration gathering and monitoring the movement of opponent's power through information radar (Fathoni, 2014).

The importance of the role of Halim Perdanakusuma Air Base in the nation's capital will be the target of other countries as well as certain groups who feel disturbed by the power of Indonesia. The military area due to the confidentiality of its operations and the leaking of information about its strength and vulnerability, ideally not joining the public domain. In fact, since it must support certain interests, within the Halim Perdanakusuma Air Base there is a commercial airport.

The existence of commercial airport in air base is already a high vulnerability, let alone must be added with the high risk of air transport accident, it will be more open opportunity for other country or group that become opponent of Indonesia country to do espionage, sabotage and even destruction. The presence of public areas within the Halim Perdanakusuma Air Base Area will facilitate access to personnel and material. Damanik (communications personnel, November 11, 2016) explains, the need for strong cooperation so that two institutions between the air base and the airport run synergistically and harmoniously.

Different command lines between the two institutions became obstacles in making a common operational procedure standard because civilian and military aviation missions were different. This condition becomes an evaluation material in decision making and policy of PT. Angkasa Pura under the State Minister for State Owned Enterprises, Ministry of Transportation and Indonesian National Army Headquarters, to find a better solution for State interests can be achieved.

Based on the results of disaster risk analysis of air transport accidents, it can be an evaluation material for the government in this

case is Minister for State Owned Enterprises that oversees PT. Angkasa Pura in the management of Halim Perdanakusuma International Airport, Ministry of Transportation which regulates commercial flight regulation, and Indonesian National Army Headquarters as the main component of defense Country. The use of Halim Perdanakusuma Air Base for commercial flights needs to be re-evaluated, given the high risk of air transport accidents.

From the result of the research, it can be concluded that the use of Halim Perdanakusuma Air Base for commercial flight can be done by first increasing the capacity of the airport to minimize the high-risk factor at Halim Perdanakusuma International Airport.

Halim Perdanakusuma International Airport Efforts in Disaster Risk Reduction

Faced with the present conditions, it is certain that there will be many shortcomings in terms of airport facilities. Lack of airport facilities is a high-risk potential for air transport accidents. The authority of Halim Perdanakusuma International Airport seeks to mitigate both structural and non-structural in the context of disaster risk reduction.

1. Structural Mitigation

Air traffic density because of the transfer of part of the commercial flight of Soekarno Hatta Airport to Halim Perdanakusuma International Airport requires a lot of improvement of airport facilities. Structural mitigation carried out includes the improvement of airport physical facilities and infrastructure which include:

First, improved runway by carrying out a routine overlay every 5 years. This improvement is done to coat the runway surface of asphalt due to eroded by the wheel of the aircraft at the time of takeoff, landing and taxi; *Second,* Regular electrical appliance repair at runway up to 70% level. Repair activities are followed by emergency operations when regular current constans can not be operated remotely from the control desk tower.

Third, Repainting markar line line center runway. The marka line on the runway up to the apron of the airport is very important, the

marker line will be a beacon for the aircraft to be on a safe path during onshore movements; and *Fourth*, Airport authorities cooperate with Air Force and Halim Perdanakusuma Air Base trying to limit the addition of flight slots.

2. Non-Structural Mitigation

In addition to the implementation of strutural mitigation focused on the improvement of airport facilities infrastructure facilities, airport authorities also undertake non-structural mitigation efforts, ie disaster risk reduction with non-physical development, while mitigation efforts implemented include:

First, Providing education and training on aviation security and safety within Halim International Airport employees premises in the form of short courses by Airport Operations Division in order to gain understanding and knowledge of aviation safety standards. Assignment of personnel to carry out education at the Aviation Institute in Curug in stages to improve the quality of human resources.

Second, Implement emergency air transport accident response at Halim Perdanakusuma International Airport area. Rehearsal conducted a joint that includes elements from Halim Perdanakusuma Air Force Base, Air Navigation, and Halim Perdanakusuma International Airport in the handling of accident victims and securing dangerous materials.

Third, to socialize the safety and security of aviation to the Community at the airport area, the activity is carried out together with Halim Air Halim perdanakusuma. Socialization is carried out routinely to respond to community behavior that can be a risk of air transport accidents, such as the dangers of laser light, kites, pets and air balloons.

Fourth, establish rules and policies as guidance for flight safety and security as outlined in making Standard Operating Procedure (SOP) and Safety Management System Manual (SMS) Halim Perdanakusuma International Airport.

Based on the joint agreement between PT. Angkasa Transportindo Selaras and the authority of Halim

Perdanakusuma International Airport, the airport is authorized to build the airport on a limited basis on existing flight facilities. In the effort to reduce disaster risk, there are several factors that become the constraint of Halim Perdanakusuma International Airport authority as follows:

First, Structural Mitigation, (1) To undertake the manufacture of reserve runways, parallel taxiways, and apron expansions, the authority of Halim Perdanakusuma International Airport has no land. This is due to his status as a civil enclave airport so that the implementation of development must have the approval of the land owner, in this case the countries represented by the Air Force, (2) With the Supreme Court decision winning PT. Angkasa Transportindo Selaras, the authority of Halim Perdanakusuma International Airport only has the authority to improve the existing aviation infrastructure. Airport development which is the development of airport expansion entirely by PT. Angkasa Transportindo Selaras, while the company has no experience in managing the airport and does not have an airport operation permit from the Ministry of Transportation,

Second, Non Structural Mitigation, (1) Halim Perdanakusuma International Airport must receive part of the number of flights that have not been able to accommodate Soekarno Hatta Airport, while the capacity of international airport Halim Perdanakusuma has not been able to enlarge, (2) Halim Perdanakusuma International Airport does not have its own budget for flight operations. The budget allocation is given by PT. Angkasa Pura II, so as not to build and repair without the mechanism of budget submission to the PT. Angkasa Pura II.

Conclusion

Based on the results of research conducted obtained the following conclusions:

First, The risk of air disaster accidents at Halim Perdanakusuma International Airport is high. Airport authorities have conducted risk assessments to anticipate air transport accidents, but have not been maximized. Based on the risk index value, the known risk factors are: High risk level, consisting of:

Runway and light navigation, Weather, Obstacle, Electrical installation, Taxiway, Air traffic density, and Density of communication channel. Whereas medium risk level, consisting of: Wildlife and FOD, Population density, Laser beam disturbance, Airport maintenance budget, Ticket price competition, and Garbage burning

Second, Efforts to reduce the risk of air disaster accidents have been made by the authority of Halim Perdanakusuma International Airport. Efforts that have been made are as follows: Structural Mitigation and Non Structural Mitigation.

Recomendation

A more in-depth study was needed to analyze disaster risk at Halim Perdana-kusuma International Airport against national defense so that the study could provide a more in-depth picture of the disaster risk control that must be undertaken, so that civil aviation operations could support the preparedness of the implementation of the Halim Perdanakusuma Airbase maintain the stability of national defense.

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