Analysis Standard Safety Risk Operating Procedures of AirNav Indonesia Head Quarter

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Abstract

Indonesia is one of the southeast Asian countries which consists of 17.504 islands separated by water. Realizing it, Government has open access so the world could see Indonesia's potential tourism through cooperation between the Ministry of Tourism and Ministry of Transportation (by optimizing hundreds of Airports and company private airports throughout Indonesia) and the Ministry of State-Owned Enterprises (through Aviation Stakeholders such as Angkasa Pura Airport, Angkasa Pura II, and AirNav Indonesia), also Airlines. According to the data sourced from Angkasa Pura II, throughout the year 2017 Soekarno- Hatta as the biggest Airport in Indonesia accommodated 63.015.620 domestic and international passengers or increasing 8% compared with the year 2016 which amounted to 58.195.484 passengers. This growth must be supported by well-systemized land and airside infrastructures which prioritize safety starting from preparation to its implementation, in this thesis intern focuses on safety in Air Navigation Services. Starting from the year 2013, the operation of Air Navigation Services is fully delegated to Perum LPPNPI then called AirNav Indonesia. Safety Management System Manual (Doc. 9859) as ICAO Document has been adopted by Indonesia to achieve safety in every aspect of aviation including Air Navigation Services. In this thesis, the intern focuses on the 2nd pillar of SMS – Safety Risk Management applied in AirNav Indonesia. To achieve ALOS, AirNav Indonesia is in the progress of a proactive approach. To realize those things in the execution, it is necessary to build Risk Analysis Standard Operating Procedure which contains Hazard Mapping, Hazard Identification and Risk Assessment (HIRA), and BowTie method to analyze, these are essential things to be done before something occurs then to be implemented for all AirNav Indonesia Headquarter and its Branches.

I. Introduction

Analysis plays an important role in decisions and recommendations making, as well as in aviation safety. Indonesia which is an ICAO member country participates in increasing the level of safety that has been set by each country through the existing aviation regulations. Thus AirNav Indonesia as the single air navigation provider approved by the state to carry out a process of air navigation services for more than 280 airports throughout Indonesia is also required to implement safety in the work environment. In its journey of it, there were many potential nuisances known as hazards. Hazard is available everywhere and cannot be removed, this hazard has a major effect on safety and due to technological developments sophisticated increasingly will also have impact on hazards which are growing.

Figure 1. *Maps Of Indonesia*

Safety is the main purpose to be achieved in air navigation services, Safety is dynamic and continues to grow in line with the times and technology. Thus, it is necessary to take steps in t proactive safety improvement process by identifying the risks caused by hazards in normal operations. These stages then lead to a process called safety risk analysis. Proper and correct risk analysis will result from safety recommendations that ensure aviation safety is achieved. For this reason, AirNav Indonesia Headquarters has prepared a safety risk analysis of standard operating procedures as one of the proactive ways in improving and enhancing aviation safety, especially in air navigation services in all airports in Indonesia.

Safety Risk Analysis is one of the safety achievement processes. In its implementation, Safety and Quality Assurance Division have a safety risk analysis program that proactively analyzes by identifying hazard and risk arising from procedures, navigation equipment, human resources, and the environment in a normal situation. The hazard exists in every operation and

can not be eliminated, but able can be managed. Whenever a hazard is identified, taking a step is required. Human activities or human-built systems cannot be guaranteed to be free from operational errors and their consequences. Therefore, safety is a dynamic characteristic of the aviation system, whereby safety risks must be continuously mitigated. As long as safety risks are kept under an appropriate level of control, a system as open and dynamic as long as aviation can still be managed to maintain the appropriate balance between production and protection.

The hazard exists at all levels of the organization's operation and is detectable through the use of reporting systems, audits, and inspections. When hazards interact with certain triggering factors, it will give results, which means that hazards should be identified before they lead to accidents, incidents, serious incidents, or any other safety-related occurrences. Proactive hazard identification can be using a voluntary hazard/incident reporting system.

II. Review of Literature

2.1 AirNav Indonesia

Indonesia consist of thousand of islands to reach out is equipped with more than 280 airports spread throughout Indonesia, those airport services including navigation services was previously handled by PT. Angkasa Pura Airport (Persero) PT. Angkasa Pura II (Persero), Directorate General of Civil Aviation (DGCA), and private parties. While Angkasa Pura and DGCA handled whole airport services including air navigation services, there was a different level of service quality. By the end of 2005 and 2007, ICAO

was conducted ICAO USOAP (Universal Safety Oversight Audit Program and Safety Performance),

ICAO concluded that aviation in Indonesia has not met the minimum requirements from international safety standards according to ICAO regulations, then Indonesia was recommended to establish an independent agency that handled air navigation services. In 2013 state established a single air navigation service provider called AirNav Indonesia. Whole air navigation services are now handled by Airnav Indonesia, with AirNav Indonesia Headquarters as the center, and DGCA as the state regulator.

2.2 AirNav Indonesia Headquarters

AirNav Indonesia as Government Organization concentrates on Air Navigation Services, also a single Air Navigation Services Provider in Indonesia. AirNav Indonesia has more than 280 branch offices spread over islands centered by AirNav Headquarters with the main objective to organize air navigation services with safety as the priority.
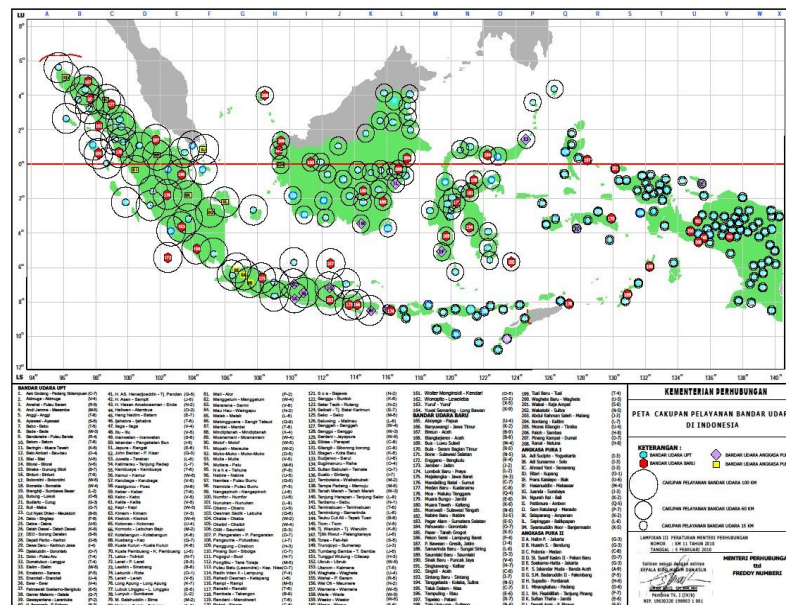

Figure 2. AirNav Indonesia branch office (source: AirNav Indonesia, 2018)

2.3. The Approach Use to Work on Subject

My background is as an air traffic controller and I work at the Civil Aviation College of Jayapura Indonesia – a government aviation school in the east of Indonesia, Papua. I work as Aviation Safety Instructor, my colleague is also an educated air traffic controller major, aeronautical communication major, and air navigation engineering major to meet the demand both in terms of quantity and quality for air navigation services personnel throughout Indonesia.

Indonesia's airspace is vast because Indonesia is an archipelagic country with different and unique geographical conditions, they have their terrain, thus requiring different handling at each airport. For instance, on Papua island, located in the east of Indonesia, half of the total airports of Indonesia are located on this island. The geographical conditions are surrounded by mountains in almost all of its airports, it started by the unpredictable weather, it is very easy to change from sunny to foggy, it makes airports have an operational time limit due to safety reasons, thus requiring special treatments of its operation especially on its navigation services. The main reason Papua island is equipped with airports is due to the geographical location is surrounded by

mountains and forests, therefore until now, air transportation mode is the only transportation mode to help their economic activities including clothing and food distribution for the citizens in its island. Papua is an island that contributes great natural results, both mining materials and plantations.
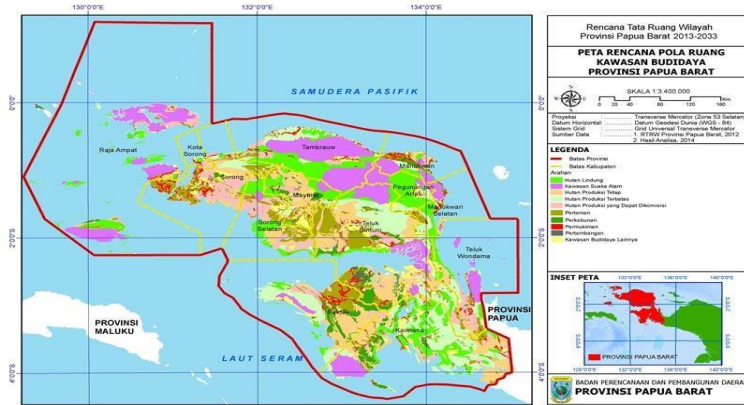
Figure 3. Papua Island and its territory

According to the explanation above, Indonesia and Papua island especially, needs special treatments in every aspect include air navigation services in order to reach safety as the goals. With those geographical conditions, safety level should achieve consistantly. In this context, Papua island is as one example of geographical conditions, the other islands have its geographical conditions also, from these situation safety is become a top priority to achieve.

2.4 Analysis of Work Expected

According to the conditions above, safety is essential things should achieve. I take my internship in the right place which concentrate in air navigation safety. My position is being contribute in a team to develop safety risk analysis standard operating procedures that AirNav Indonesia does not have yet. Branches send their hazard identification and risk analysis report to headquarter office every month. From the reports the team re-analyze the hazard, its treat and the consequences may happen.

Intern find the report form called HIRA (hazard identification and risk analysis) that has not been systematic yet and needs to be refined so as branches will understand the deep comprehension of Hazard, treat, and consequences its self correctly. According to the situation exist, Airnav Indonesia should develop the parent document that loads risk management understanding and its basic measure, safety risk analysis standard operating procedures is the parent document to equate understanding as well as how to analyze hazard, its cause/ treat, and consequences, also root cause analyzing tools, and mitigation measures.

Intern assisted AirNav Indonesia in developing safety risk analysis standard operating procedures that planned to delivered in agust 2018 then undertaking into a AirNav regulation to be followed by branch office. Intern also expected to deliver presentation session of the safety risk analysis standard operating procedures and its content, after the presentation intern will get some reports from branch office, which continue in verification processes doing by AirNav Headquarters.

The processes of developing safety risk analysis standard operating procedures also takes some processes are like focus group discussion with other working division, brainstorming stage with some branch office, and regular intern meeting so as to perfecting the risk analysis standard operating procedures to be created.

III. Research Method

3.1 Safety Plan

The table below shows the implementation of the existing safety risk management process at AirNav Indonesia headquarters. This table describes a number of conditions that should be implemented with the real conditions in AirNav headquarters. In the GAP analysis which is carried out, there are quite a number of requirements of risk management process that partially implemented even not yet implemented. This analysis result is one of the intern reasons to assist developing the safety risk analysis standard operating procedures.

3.2 Brainstroming and Safety Meeting

AirNav Indonesia headquarters conducts internal meetings to discuss the branch office with routine risk analysis reports that are reported monthly to airnav headquarters. The purpose of this activity is to know the weaknesses and problems experienced by the branch office so that the headquarters as the coach can provide recommendations for the safety development of air navigation services at the branch office/unit. Routine internal discussion also talks about the determination of the acceptable level against threat and consequence that will occur if a hazard is released into occurrence. Because of the hazard cannot be eliminated there lies the need to determine an acceptable level both in the operation scoop and technical scoop.

In the safety meetings, AirNav Indonesia routinely invites relevant stakeholders such as Angkasa Pura I and II Persero that handle almost all airports operation in Indonesia, also airlines in Indonesia with the aim of brainstorming with external parties. Of course at this safety meeting, the airlines have summarized the overall occurrences that occurred in the last month which became AirNav Indonesia's contribution. With the explanation and some inputs from the airlines as a user of air navigation services, it certainly helped AirNav Indonesia in the future to improve safety both operationally and technically. Safety meetings are attended by parties who contribute / work with concentration in the safety and risk analysis.

Table 1. Intern timeline Working Schedule

NO	ACTIVITY	DURATION						
		March	April	Mey	June	July	August	Sept
1	Intern Thesis Subject	██						
2	First Month Report	██						
4	GAP Analysis	██	██					
5	3rd month report	██	██	██				
6	Abstract	██	██	██				
7	Internal meeting & safety meeting		██	██	██	██		
8	Hazard Mapping (technique & Operational)		██	██	██			
	Technique		██	██	██			
	facility		██	██	██			
	Operational		██	██	██			
	Facility		██	██	██			
	Human Resource		██	██	██			
	Environment		██	██	██			

9	HIRA Form				
	Branch Purpose				
	Headquarters Purpose				
10	Bow Tie analysis				
11	Flowchart HIRA and Bow Tie				
12	SOP Drafted (product)				

3.3 Hazard Identification Sources

Hazard may be identified in the aftermath of actual safety event (accidents or incidents), or

they may be identified through proactive and predictive processes aimed at identifying hazard before they are released into safety events.

There are a variety sources of haard identification. Some sources are internal to the organization while other sources are external to organization. Examples of internal sources of hazard identification available to an organization include :

a. Flight data analysis
b. Company voluntary reporting system (EFFORT for AirNav)
c. Safety surveys d. Safety audits
e. Normal operations monitoring schemes
f. Trend analysis
g. Feedback from trainings
h. Investigation and follow-up of incidents

Examples of external sources of hazard identification available to an organization include :

a. Accident reports
b. State mandatory occurence reporting system
c. State voluntary reporting system
d. State oversight audits
e. Information exchange systems

IV. Results and Discussion

4.1 AirNav Indonesia Branch Offices

AirNav Indonesia Headquarters has more than 280 branch office, in its implementation AirNav headquarters define to choose 33 office as main branch offices which will organize other branch offices in their respective territories so as to simplify monitoring the working progress including safety performance process.

Figures 4. *AirNav Indonesia 33 main branch offices deployment (source: AirNav HQ-2017)*
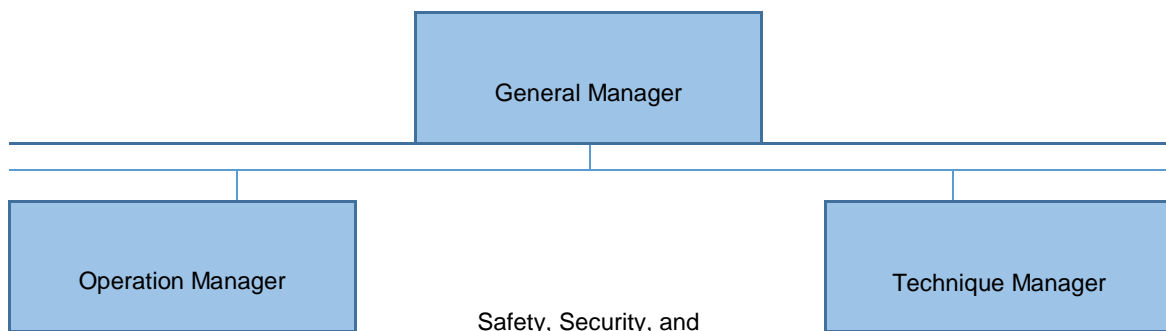
Every main branch office are lead by a General Manager who has key performance indicator for his/her leadership to be achieved that called acceptable level of safety (AloS) and on time performance. This thesis focus in acceptable level of safety (AloS). To implement its purposes, safety division in main branch offices organization structure should be put. According to air navigation national regulations, AirNav Indonesia has responsibility in operational and technique. The scoops are as follow :
a. Operational
     The scoops are procedure, human resources and environment
b. Technique
     The scoop is facilities In order to implement the rules above, then AirNav Indonesia Headquarters incorporates the safety division into 33 main branch offices organization structure as below:


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                    General Manager


Operation Manager                    Technique Manager
            Safety, Security, and
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Figure5. *Main Branch Office structure organization (source: AirNav Indonesia HQ-2017)*

4.2 Intern Expectance

     In the future after the internship ends, the author suggests holding a short training for employees in each of the main branch offices of AirNav that handle safety. This training is about safety management system for flight navigation providers where in this training the second pillar of SMS is emphasized namely safety risk management.

     This training is train of trainer, so that when the training is completed it will be held again by the main branch office to the unit offices under the supervision of the main branch office. Socialization of the implementation of HIRA and Bowtie also needs to be done for all employees of AirNav head office whose function is to carry out the supervisory function in the branch office. So in this case a workshop needs to be held, this is in order to get a thorough understanding of the importance of identifying the hazard correctly and the risk analysis steps that must be taken. Intern also expected for every branch office to make hazard mapping so it will helpful to clasify the probability and severity of the risks and its mitigation.

4.3 Safety Risk Analysis Training

     Intern recommend AirNav headquarters to provide training related to safety management system, with concentration in safety risk management. This training is intended for for each representative who working in safety division and daily facing safety management. The training is also expected to be attended by representatives of regulators, especially for those who handles air navigation services. The instructor may hier from countries that have established and implemented safety management system well, or lecturers in aviation that already had safety management system theories and expert in safety risk management. In the previous chapter already mentioned that AirNav Headquarters has 33 main branch offices who will be the representative of the

headquarters. Thus the participants of training will attend from 33 safety representative from each main branch offices.

4.4 Participants:
1. Aceh (2 person)
2. Ambon (2 person)
3. Balikpapan (2 person)
4. Bandung (1 person)
5. Banjarmasin (2 person)
6. Batam (1 person)
7. Bali (1 person)
8. Halim (1 person)
9. Jambi (1 person)
10. JATSC (1 person)
11. Jogjakarta (1 person)
12. Kendari (1 person)
13. Kupang (2 person)
14. Lombok (1 person)
15. Manado (2 person)
16. MATSC (3 person)
17. Medan (2 person)
18. Merauke (2 person)
19. Nabire (2 person)
20. Padang (1 person)
21. Palangkaraya (2 person)
22. Palembang (2 person)
23. Pekan baru (1 person)
24. Palembang (1 person)
25. Pangkal pinang (1 person)
26. Pontianak (2 person)
27. Semarang (1 person)
28. Sentani (4 person)
29. Sorong (2 person)
30. Surabaya (2 person)
31. Tarakan (2 person)
32. Tanjung pinang (1 person)
33. Wamena (3 person)

The total of 55 incharged personnel will be trained about the safety management system especially concentrate in safety risk management which is then concentrated on understanding hazard identification, risk analysis process, and risk mitigation. Where there is hazard identification and safety risk assessment and mitigation. The purpose of this training is to build concepts and understanding of safety, strengthen understanding of safety risk management and its processes, understanding of risk models, understanding about filling out HIRA forms both manually and electronic forms, and as well as understanding the flow of thinking using BowTie tools. So when safety risk analysis standard operating procedures are implemented, all branch offices have understood and can immediately adjust the safety risk analysis stage of these standard operating procedures.

General objectives of this safety risk analysis standard operating procedures implementation :
1) To understand how safety risk analysis process could improve the safety of air navigation operation.
2) To equate understanding the safety risk analysis processes.
3) To facilitate AirNav branch enhance the ability of risk analysis and report.
4) To assist AirNav headquarters in verifying and simplification the reporting process.

4.5 Hazard Identification and Risk Assessment (HIRA) Future Prospect

In the future, HIRA reporting will be accessed by branch offices with an electronic format that is integrated with the web / online AirNav Indonesia safety reporting system, namely the Electronic Form For Occurrence Report (EFFORT). It will be mobilize reporting system, so the report can easily be reached whenever and wherever. The progress is now running to build the integration system and will be applied in 2019.

V. Conclusion

a. Hazard is a condition, an object, unwanted state, dangerous object/situation, increased accident probability and severity with the potential of causing injuries to personnel, damage to equipment/ structures, loss of material, and reduction of ability to perform a prescribed function. The causes and consequences of operational errors are never linear in their magnitude. The hazard is caused by threat and will be released into risk and consequence if there is no such mitigation.
b. Because of errors can not be avoided but it shall be well known, so Identification of hazard is required to assess its potential harm and the risks, this involves 2 considerations : probability and severity.
c. While severity of consequences can be defined, the probability of occurence may be more subjective, it based on the maturity of organizational safety activities, this one of reason AirNav Indonesia develop safety risk analysis standard operating procedures.
d. Mitigation measures is the action of reducing the risk and its consequences.
e. Training is needed for embraces the specification and evaluation to train the way of think also communication, siatuational awareness, problem solving, decision making, judgement, stress management and interpersonal skill.
f. The implementation of safety risk analysis of standard operating procedures is needed because AirNav Indonesia serves air navigation in hundreds of airports throughout Indonesia with different geographical locations, therefore understanding of hazard and risk management is absolutely necessary.
g. Hazard mapping is needed to simplify classifying the probability and severity of each risks.
h. Hazard identification and risk assessment (HIRA) form is a stage that must be carried out by branch offices in safety risk analysis. From the existing HIRA report, headquarters can analyze, verify and provide safety recommendations.
i. BowTie is used in safety risk analysis as a root cause analysis tool that helps systematic thinking.
j. Hazard identification and Risk Assessment (HIRA) form will be integrated with the EFFORT system via the web, which will make easier for branch offices to report HIRA, so it will be easier for headquarters to access HIRA reports throughout branch offices in every circumstances.

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