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Developing a Conceptual Model of Organizational Safety Risk:Case Studies of Aircraft Maintenance Organizations in Indonesia

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Abstract

In Indonesia, the rate of accident and serious incident of aircraft have reached alarming stage. National Transportation Safety Committee affirmed that human errors played the biggest role from period 2007 – 2013. Although there are several possible causes for human error, one of the most critical elements is the quality of Aircraft Maintenance Organization, especially the human resources.To get basic knowledge of human factor, the first step of this study is literature study. The literature reviews showed that there are at least four factors that influenced human errors. They are Organizational Design, Safety Climate, Safety Performance, and Safety Outcome. After the factors were discovered, the next step is choosing the methodology. Since most of the literatures used models to describe the situation, this study will use similar approaches. Ostroff et al Model (2003) and Christian et al Model (2009) are chosen among the model because they can represent the most accurate situations in Aircraft Maintenance Organization in Indonesia. To get an added value, after these two model are merged, Principle of Hoffman (2003) is used to give a better and upgraded model. The proposed model is then explained through six proposed hypotheses, in which two of them are the added values. To collect the suitable data for the model, the final step is deciding the operational variables which are described on the form of tables for each factor. Each variable is tested through sub-model. Method used for gathering data is questionnaire which uses Likert scale test. The result of Likert scale test and the sub-models will become the proposed model. The proposed model is expected to give Aircraft Maintenance Organization a better understanding on human error and make them focus their improvement on human factor more so that the rate of accidents and serious incidents in Indonesia can be reduced significantly.

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*Keywords:*Aircraft Maintenance Organization, Organizational Design, Safety Climate, Safety Performance, Safety Outcome

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1. Introduction

In Indonesia alone, through the National Transportation Safety Committee (NTSC), it is affirmed that the human factor is the main cause nearly 60% of aviation accidents in Indonesia, only 34% were attributed to technical problems and the remaining is environmental problems, this percentage indicates the phenomenon of human error that occurred in Indonesia, it shows that the Human Resources in the troubled aviation organizations and require an increase in flight safety service standards. In addition to human resources, technical issues also still has a high percentage as the cause of the accident, this shows that the field of aircraft maintenance needs attention because of the potential to reduce the level of safety.

Based on data from the NTSC rate of accidents and incidents has reached alarming stage. On the duration of the year 2007 - 2013, there were 87 Accidents and 82 Serious Incident in Indonesia, where the Papua Island ranked first with 26 Accidents and 19 Serious Incident and Java Island was ranked second with 20 Accidents and 21 Serious Incidents.By taking the average per year, data showed that in 2007 had the worst accident rate with a value of 3.14, the year 2008 has an accident rate of 2.93, and in 2011 had an accident rate of 2.51. Only in 2013 included in the limit with the accident rate of 0.46 accidents.

Ostroff et al, (2003) describes the completeness of the safety models require coverage and social culture integration (e.g. security climate) and structural (structural and safety practices of the organization) organizational aspects that affect safety.

Mohaghegh (2007) developed a framework of safety analysis organization called SoTeRiA (Socio-Technic Risk Analysis). This model describes the dynamics of technical problems, social and behavioral done in layers, on individual, group, and organization. Analysis of safety risk management involves multiple disciplines that are in a container called Safety Risk Analysis Organization. SoTeRiA explained that there is a theoretical relationship between the organization's safety culture, safety structures or practices of the organization, organizational safety climate with specific differences between the safety culture and safety climate.

Christian et al (2009) explains that the behavior of people (workers) and factors affect the situation of safety performances and safety outcomes in the form of accident or injury.

Organizational Structure On Aircraft Maintenance Organization in Indonesia

Organizational structure is a formal framework in which the framework of the job tasks are divided, grouped and coordinated, while organization design is preparing and modifying the organizational structure (Robbins, 2004). The explanation shows that the role of the organizational structure of a company is crucial to the achievement of organizational goals.

Each Aircraft Maintenance Organizations officially registered by the Directorate of Airworthiness and Aircraft Operation, Ministry of Transportation of Indonesia, should have the same basic organizational structure in accordance with the standards set by the existing regulations. Aircraft maintenance organization refers to the standardized work. The job holder has little freedom as to what to do, when to do it and how to do it. Work should refer to the manuals and documents that are written in the organization.

Understanding which states that management and organizational factors as major contributors to the problem of operational safety has been studied by various methods of quantitative safety and risk assessment which led many to believe that the causal modeling is an effective way to assess the effects of the risk factors of safety organizations (Mohaghegh, 2007). However, there are a number of major challenges in developing construct models of organizational safety performance. Field studies have revealed the fact that salvation is achieved from safety culture application (Kennedy et al., 1998).

Thus, this study begins by describing the conceptualization construct a model of safety by doing integration between structural effects model organization (Ostroff, 2003) with the safety performance (Christian, 2009) which refers to the results of the safety outcomes. Models of organizational effectiveness are used as the basic model of the organizational safety, because the organizational structure is the controlling behavior, and is defined as the value of the safety of certain behaviors produced in accordance with the organizational structure (Suryaningsum, 2008).

From these explanations it is clear that safety is one of the desirable attributes of the performance of the organization,this attribute must be beneficial and at the same time provide a sense of security. The performance of the organization should consider the interaction of safety performance with output of other organizations, such as

profit and quality. As explained by Ostroff (2003), safety is one of the output organizational accident theory that the risk of the organization's safety should be based on the model of organizational performance that includes social and structural. Likewise, safety climate is sub-faceted organizational climate, and expressed as a shared perception of employees regarding the implementation of the organization's safety (Zohar & Luria, 2005, Griffin and Neal, 2000). Therefore, this study adds organizational structure as forming the safety climate to determine safety performance which in turn becomes predictor for safety outcomes. This research collected some research that had been done and put them in containers of Safety Risk Analysis Organization.

- Rhoades, et al. (2005) describes the effect of the cost of maintenance of aviation safety and application maintenance support aviation safety.
- Mohaghegh (2007) differentiates and builds culture of safety and security climate and builds SoTeRiA model to determine the decision-making process from the individual level to the organizational level and to determine the number of workers, the recruitment process, the process of training, and organizational structures that support the safety culture.
- Christian, et al. (2009) builds a theoretical model of the performance of the workers and the working climate and quantitatively integrates safety literature using meta-analytic predecessors based on the situation, people, and the behavior of safety performance and safety outcome.
- Suzuki et al. (2008) proposes a safe and appropriate behavior and coordination of in the commercial aircraft maintenance and reduce the chances of miscommunication between workers.
- Sharpanskykh et al. (2011) describes an understanding of safety culture with the structure and organizational processes, implements organizational safety culture on the ANSP (Air Navigation Service Providers) and designs the organizational structure and interactions more effective.
- Kristy, et al. (2012) examines the relationship between decentralization and alignment with organizational output level of safety.
- Pourdehnad, et al. (2012) shows a lot of things can be learned from the airline industry on organizational learning practices that can be implemented by organizations in an attempt to cope with the demands of the triple bottom line sustainability. (Learning and Adaptive Systems).
- Lin (2012) examines the relationship between the safety culture and the identity of the organization's safety management system (SMS), in order to provide a greater awareness of how the airline employee looked organizational identity and culture of safety because they managed to implement SMS.
- Bouarfa (2013) explains that the system is a complex socio-technical can produce various types of behavior emerge, which can range from simple emergence, until the emergence of strong. The finding of the new behavior that occurs is that the warning system is not actually reduce security risks.
- Shi (2013) describes the relationship CWB (Counterproductive Work Behavior) with the working environment and work performance, creating a work environment that can minimize the CWB.
- Daft (2013) defines the organization as a social entity design oriented destination, designed as a carefully structured and coordinated activity systems and associated with the external environment.

In line with the research background, research questions to be answered are:

- What are the factors that affect the organization of the organization's safety risk?
- How does the design an organization that should be accommodated in the model affect the performance of the organization's safety and the safety outcomes organization that exists today?
- How is a model of the organization's safety constructed within the framework of the dynamics of air freight transport safety system?
- What policy alternatives can be provided to improve safety performance on the air freight transport organizations?

2. Literature Review

2.1. Organizational Design

One of the first attempts to identify and determine the factors that affect the security of the organization were carried out by Jacobs and Haber in 1994. Their research resulted in Jacobs and Haber Classification (1994).

Even if the specific root cause of this could be avoided by additional safety activities, what happened would emerge by other causes. Therefore, new methods of risk management must focus on behavioral mechanisms in the context of a dynamic workplace that result in the prevention system approaching safety limits (Rasmussen, 1997).

Normal Accident Theory, developed by Perrow (1984), is seen as an inevitable accident in the socio-technical complex. According to Weick and Sutcliffe (2001) and Roberts and Bea (2001), serious accidents can be prevented with good management process in the organization.

Classic work on the design of the organization has sought to identify key structural factors that describe the organization and proper arrangement of the structure that maximizes the various types of performance (Pugh et al., 1969). Some organizational designshave been developed such as: specialization, functional differentiation, professionalism, formalization, authority, intensity of the administration, centralization, internal communication, vertical differentiation, and alignment of policies and procedures (Galbraith, 2005; Price & Mueller, 1986b).

Henry Mintzberg (1993, p.2) argues that every organized activity poses two fundamental requirements and the opposite: the division of labor into tasks, and the coordination of these tasks to complete the activity.

The organization is a nexus of multiple, sometimes contradictory, duties and functions (Gresov&Drazin, 1997), and the designer must determine what the best structure will secure the performance of each of these functions separately; how cross-functional coordination will occur; and how the trade-off decisions will be made in the event of a conflict between duty (Lawrence and Lorsch, 1969).

Daft (2013) defines Organization Design as a social entity design oriented destination, designed as a carefully structured and coordinated activity systems and associated with the external environment. There are two proposed operational variables, namely Structural and Contingency.Structural is a state variable that describes the internal characteristics of the organization and create a basis for measuring and comparing the organization. This variable has four subvariables, namely a Formalization, Specialization, Hierarchy Powers and Centralization.Contingency is a state variable that may occur. This variable has five subvariables, namely Culture, Environment, Objectives and Strategy, Size, and Operational Technology.

Pugh (2013) defines Organizational Design as how activities such as task allocation, coordination and supervision are aimed at the achievement of organizational goals.Pugh divided them into six variables, namely Specialization, Standardization, Formalization, Centralization, Configuration, and Traditionalism.

Jacobides (2007) defines Organizational Design as a glass or perspective through which individuals see their organization and its environment.

Mohr (1982) defines Organizational Design as seeing the importance of the structure for effectiveness and efficiency and assumed without the slightest question that whatever structures are required, people can shape accordingly.

Referrals that have been mentioned are then used as the basic determinant of variable safety research organization. This study tries to summarize these variables as follows:

- Rhoades, et al. (2005) divided the variables into two, namely Aircraft Maintenance Program Variables and AircraftInspection Variable.
- Mohaghegh (2007) divided the variables into three, namely Organizational Knowledge Variables, Work Coordination Variables and Personnel Selection Variable.
- Suzuki et al. (2008) divided the variables into two, namely Communication Variable and Technical Knowledge Variable.
- Sharpanskykh et al. (2011) divided the variables into two, namely Safety Culture Variable and Performance Evaluation Variable.
- Lin (2012) mentioned only one variable, namely Organizational Learning Variable. This variable constructed L & A Model (Learning and Adaptation Model).

- Pourdehnad, et al. (2012) divided the variables into two, namely Organizational Culture Variable and Safety Culture Variable.
- Shi (2013) mentioned only one variable, namely Technical Knowledge Variable, but he divided it into two subvariables, namely Human Agent Subvariable and Non-human Agents Subvariable.
- Bouarfa (2013) divided the variables into two, namely Culture Variable and Performance Evaluation Variable.

2.2. Safety Climate

Safety Culture and Safety Climate are two things that are the same at first glance, but in fact different. Safety Climate is an embodiment of Safety Culture that can be assessed objectively.

Schein (1992) made a model of organizational culture. Given Safety Culture is part of Organizational Culture Schein's Model (1992) can be used in the approach of safety culture definition.

Cooper (2000) used Schein's definition of culture (1992), which defines Safety Culture in an organization asthe product value, attitude, competencies, and patterns of behavior of individuals and groups. Cooper identified three aspects that are important in building a Safety Culture, namely; Psychology Aspect, Behavior Aspect, and Situational Aspect. First is the Psychological Aspect. This aspect is referred to as dimension 'of how people feel', which deals with the emotional contribution to SafetyCulture, which include; values, norms, beliefs, attitudes, and perceptions. Second isBehavior Aspects. This aspect is referred to as a dimension of 'what people do', as evidenced by the actions, behavior and activities of a person in the organization. Third is Situational Aspect. This aspect is referred to as the dimension of 'what organization has', which is reflected in organizational policies such as; standard operating procedures, safety management systems, reporting systems, and communication structure.

From here, the conclusion can be obtained that the Basic Assumptions made the difference between Safety Culture and Safety Climate. Basic assumptions are things that can not be measured because it relates to values and norms of a person or a group.Because the distance between the Safety Culture and Safety Climate are close, some experts combine into one and some others separated. Some expert opinion that separates the two, among others are:

- Schneider (1990) stated that Safety Climate was just an indication of the beginning of the culture, it can not fully explain the 'wealth of culture' of an organization.
- Cox and Cox (1996) illustrated the culture and climate differences through analogy, culture is the personality and the climate is mood.

Here are some definitions put forward by Organizational Design researchers.

Wiegmann et al (2002) defined Safety Climate as the measurement of transient state of Culture Safety, subject to the similarity between the individual's perception of the organization. It was based-situational, referring to the perceived safety of the state in a certain place at a certain time, relatively unstable, and can change depending on the features of the current environment or the prevailing conditions. There are five variables proposed, namely the Organizational Commitment, Involvement Management, Employee Empowerment, Reward System, and Reporting System.

Dedobbeleer and Beland (1991) of the Construction, the US Occupational Safety defined climate as the individual attributes to safety. There are two variables proposed, namely Management Commitment to Safety and Worker Involvement in Safety.

Griffin and Neal (2000) defines Safety Climate as a higher factor consisting of more specific first order factors. The first order of safety climate factors must reflect the perception of the policies, procedures related to safety and efficacy. The higher the order of a factor of safety climate should reflect the extent to which employees believe that salvation valued in the organization. There are four variables proposed namely Management Value, Safety Inspection, Personnel Training and Safety Communications.

Mohamed (2002) defines Safety Climate as a safe work behavior, as well as the reciprocal of unsafe behavior.There are ten variables proposed, namely Commitment, Communication, Safety Regulations and Procedures, Sympathetic Environment, Overseeing Environment, Worker Involvement, Personal Risk Respect, Work Hazard Assessment, Work Pressure, and Competence.

2.3. Safety Performance

Definition of Safety Performance in general is less visible because it usually relates to Safety Outcome and Individual Safety Performance Behavior.

Christian et al (2009) divided the definition of safety performance into two, namely size of the organization for the safety outcome and metrics of individual behaviors related to safety. The size of the organization for the Safety Outcome can be generally measured, such as the number of injuries per year. Safety-related individual behavior metrics can not be measured and is related to psychological factors.Given the nature of the Safety Performance, Christian et al (2009) concentratedSafety Performance Factor more on the size of the organization for the safety outcome because it is more easily measured so that the results are more objective.

Roelen and Klompstra (2012) defined Safety Performance as an accident opportunity achieved in relation to the chances of accidents that are considered unacceptable. The basic definition is ISO definition of safety (1999) and ICAO definition of accident (2001). ISO (1999) defined safety as freedom from unacceptable risk, while risk is a combination of loss occurrence chance and severity of losses. ICAO itself defined crash into some definitions, but since this study focused on Aircraft Maintenance Organization, ICAO definitions focused on flight safety case. ICAO (2001) defined accident as an event that led to death, serious injury, or serious damage to the aircraft.

Khdair et al. (2011) defined Safety Performance as a very complicated and sensitive organizational attention because it lives about people and resources, which are involved in the project to success. Eight variables proposed, namely Human Behavior, Economics, Psychology, Organizational, Individual and Social, Environment.

Wu et al. (2008) defines Safety Performance as the quality of work related to safety which is a small part of the total performance of the organization.

2.4. Safety Outcome

Although in general Safety Performance becomes the benchmark in Safety, there is one factor that can be a substitute or support for Safety Performance, namely Safety Outcome.

The literatures provide an overview of Safety Outcome, but all do not give a concrete definition because it is more centered on the definition of accident and injury.

Christian et al (2009) described the safety outputs as a result or a result that can be observed. There are three variables proposed, namely accidents, injuries, and death.

European Statistics on Accidents at Work (ESAW) in 2001 used Work Accident as the definition of Safety Outcome. Based on this, the definition of Safety Outcome is a "discrete event in the program of work" that leads to physical or mental work accidents.

3. Methodology

3.1. Major Model References

The basic model references are two, namely Ostroff Model (2003) and Christian Model (2009).

Ostroff Model (2003) is a heuristic model to search for culture and climate within the conceptual framework at the aggregate and individual level analysis. This relationship highlights the key roles that need to understand the culture and climate phenomena in understanding the organization.

The organizational structure in Ostroff is a tool of employees' perception of climate and subsequent attitudes, responses, and behaviors that are formed. On the unit or organizational level, cultural value and assumption lead managers to adopt explicit or implicit structural features and conditions, which affect the climate develops. Leaders recognized by organization played a key role to create and shape the culture and climate (Schein, 2010 ; Schneider et al, 2011b) but also to facilitate the proper alignment between cultures, practices, and climate (Chow & Liu, 2009). Attitude and behavior of employees collectively are shaped by climate and in turn influence organizational effectiveness, performances, and efficiency. Support for the relationship has been analyzed in several recent studies (e.g., Hemmelgarn, Glisson, & James, 2006; Ngo, Foley, &Loi, 2009).

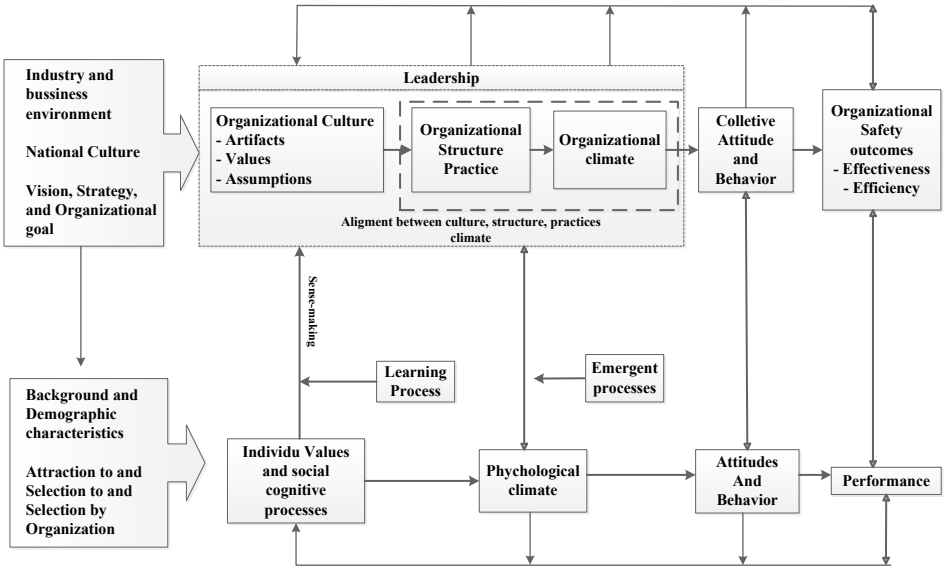

Figure1Multi-LevelOrganizationaldanClimate Culture Model (Ostroff et. al, 2003)

Source :Ostroff (2003)

OstroffModel is adopted because this model assumes there is a theoretical relationship between organizational culture, organizational structure, and organizational climate. Completeness of safety models require coverage and social integration (e.g., safety culture and climate) and structural aspects of the organization (structure and safety practices of the organization) that affect safety. This model focuses on aspects of social or structural.

Based on the Ostroff Model, the hypothesis is proposed as follows:

H1: Organizational Design positively influences Safety Climate.

The second model is the model of Christian et al (2009). This model modified the safety model of Neal and Griffin (2004). This model is based on the performance theory of Campbell et al. (1993), which identified three determinants of the performance of individuals, namely knowledge, skills, and motivation for performance. This model suggest that the factors that preceded the performance factor (eg, training, organizational climate, personality) is estimated to affect safety performance through the improvement of these three factors.

Christian et al. assume that situational factors, individual differences, and attitudes have a distance relation to safety performance and this relationship even more has a range of safety outcome. These factors are expected to impact more closely or directly affect the behavior of safety performance.

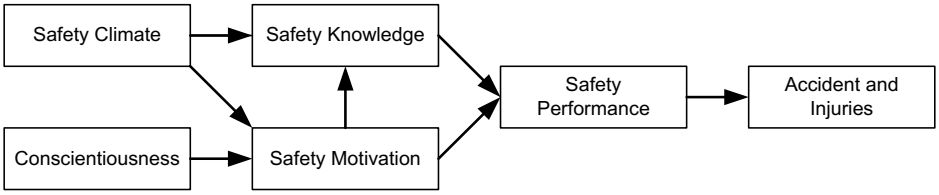

Figure 2 Safety Model of Christian et. al, 2009

Source : Christian et. al (2009)

Christian model is adopted for the reason that behavioral and circumstance factors indicate a relationship to job safety. Workers can be selected, trained, and supported by a positive safety climate to maximize safety motivation and safety knowledge, which in turn leads to behavior that is safe and produces fewer accidents and injuries. In the particular climate dimensions indicate the point of intervention associated with an increased safety.

Based on Christian model, the hypotheses are proposed as follows:

H2: Safety Climate positively the Safety Performance.

H3: Safety Performance negatively influences Safety Outcome.

3.2. Model Development

Although both models above are good enough, each model has its drawbacks.

Model of Ostroff, et al (2003) has not made a theoretical relationship between the social and structural aspects. To be able to provide valid arguments about the relationship of social and structural aspects, the relationship must be defined. Based on previous research, it appears that they have a relationship, but the definition is needed to be the basis for a hypothesis or scientific evidence.

Model of Christian et al (2009) does not explain the situational factors that may be the moderator of relationship of individual differences (predictors) with accident and injury criteria.

To overcome the shortage of the two models above, one principle is added, namely the principle of Hofmann et al (2003). Principle of Hofmann et al (2003) is used for seeing safety as a moderator climate that encourages formal role for the purpose of safety behavior. In this study the safety climate expressed as shared perceptions of employees about the organization's safety practices is used as a moderator that is considered to improve the safety performance.

Principle of Hofmann et al (2003) became the basis of the following hypotheses:

H4: The relationship between the Organization Design and Safety Performance will be stronger with positive Safety Climate moderator.

By combining Model of Ostroff, et al (2003), Model of Christian et al (2009), and Principles of Hofmann et al (2003), a new hypothesis is proposed as follows:

H5: Safety Performance mediates the relationship between Organizational Design and Safety Climate with Safety Outcome.

Seeing **H1** and **H2**, the model could prove that Organizational Design has a relationship with Safety Performance. H4 has proven it indirectly. Therefore, if H1, H2 and H4 are combined, there will be a relationship again in form of a direct relationship between Organizational Design and Safety Performance. From here, a new hypothesis is proposed as follows:

H6: Organizational Design positively influences Safety Performance.

An overview of this new model can be seen in Figure 3 below.

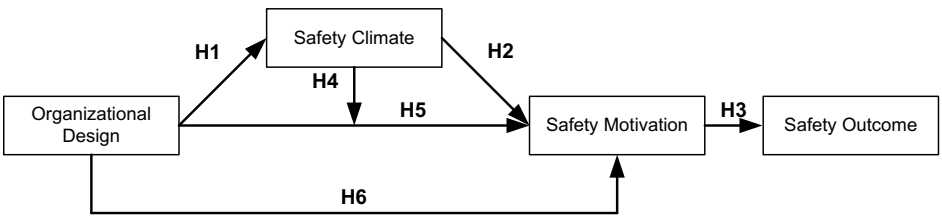

Figure3Proposed Model

Combined hypotheses to be tested in the new model are as follows:

H1: Organizational Design positively influences Safety Climate.

H2: Safety Climate positively the Safety Performance.

H3: Safety Performance negatively influences Safety Outcome.

H4: The relationship between the Organization Design and Safety Performance will be stronger with positive Safety Climate moderator.

H5: Safety Performance mediates the relationship between Organizational Design and Safety Climate with Safety Outcome.

H6: Organizational Design positively influences Safety Performance.

3.3. Operational Variables

To complete the proposed model and hypothesis, the next step is to determine the operational variables. Operational Variables aim to know the concept and scope of such variables along with the indicators that can be used as a measuring tool.Each variable has a basis for the formulation. The basics are:

- Organizational Design bases onvariables of Daft (2013).
- Safety Climate bases on NOSCAQ.
- Safety Performance bases on 2008 ICAO regulations.
- Safety Output bases on Christian et al (2009) Model

Organizational Design includes Formalization, Specialization, Hierarchy of Power, Centralization, Culture, Environment, Goals and Strategy, Size, and Organizational Strategy.

Safety Climate includes Safety Priority, Safety Responsibility, Safety Resources, Safety Improvement, Safety Right, Self Esteem on Organizational Safety Records, Error Tolerance, Reward, Punishment, Organization Involvement on Safety, Workers Commitment towards Safety, Safety Priority Measurement, Safety Priority and Needs, Sensitivity to Safety, Learning, Communication, Trust, Safety Inspection Frequencies, and Safety Training.

Safety Performance includes Management Commitment, Safety Goals, Organizational Methods, Processes, Structures, Safety Management of, Process and Procedure, Communication and Cooperation, Starting Process of SMS Implementation, Field Process of SMS Implementation, SMS Implementation Evaluation, Response to Change, the SMS Update, safety Curriculum, Communication Safety.

Safety Data output includes Accidents and Injuries.

3.4. Samples

To test the hypothesis above, the author uses sampling method on the employees who work on five repair and aircraft maintenance hangar in Indonesia. A total of 500 respondents were from the fifth hangar, hangar election was taken from the hangar which has a capacity capable of doing repair (Maintenance, Repair, Overhaul). Each hangar has the same number of workers that is not so for the extraction is done in proportion as many as 82 respondents answered the question, of variable design, climate and safety performance. Of the 500 respondents who answered that something's not filled completely, so the authors decided to eliminate answers from the respondents. Companies that respondents answered in full but less than 50 of our respondents then even this elimination. We assume the tests performed if fewer than 50 respondents will result in the representation of the condition of the organization. Finally, after the screening there were 352 respondents who are considered capable of representing this test and come from only three hangars. Sampling error is used on 5% and Confidence Level is at 95%. Accident Data was obtained from the injury of the National Transportation Safety Committee Measurements using enclosed questionnaire.

3.5. Measurement Scales

The result from questionnaire is then checked using Likert scale with 4 scale; which 1 is Strongly Disagree, 2 is Disagree, 3is Agree and 4 is Strongly Agree. This scale is considered quite able to describe the condition as the perception of the respondents. This scale is considered quite able to describe the condition as the perception of the respondents.

3.6. Result

Data processing was performed using SPSS / PC V. 19 for Window with Path Analysis method. Path Analysis is useful to look at the causal relationships between variables. The model was composed of six sub-models describing the relationship between organizational Design, Safety Climate, Safety Performance, and Safety Outcomes.

Sub Model 1 is relationship between Organizational Design and Safety Climate. The result of the test shows that this relationship has a value of t test of 3.332 and a coefficient of 0.333 and significance level at 0.002. This means that Organizational Design variable has a significant effect on Safety Climate.

Sub Model 2 is the relationship between Safety Climate and Safety Performance. The result of the test shows that this relationship has a value of t test of 0.222 and a coefficient of 0.020 and significance level at 0.001. This means that Safety Climate variable has a significant effect on Safety Performance.

Sub Model 3 is the relationship between Safety Performance and Safety Outcome. The result of the test shows that this relationship has a value of t test of 1.754 and a coefficient of 0.175 and significance level at 0.002. This means that Safety Performance variable has a significant effect on Safety Outcome.

Sub Model 4 is the relationship between the Organization Design and Safety Performance, which is further strengthened by a positive relationship of Safety Climate. The test gives R2 value of 0.807 or up to 80.9%.

Sub Model 5 is the relationship between the Organization Design and Safety Outcome, which uses Safety Performance as the mediator. The result of the test shows that this relationship has a value of t test of 1654 and a coefficient of 0.165 and significance of 0.001. This means that Organizational Design variable has a significant effect on Safety Outcome.

Sub Model 6 is the relationship between the Organization Design and Safety Performance. The result of the test shows that this relationship has a value of t test of 3.656 and a coefficient of 0.363 and significance level at 0.000. This means that Organizational Design variable has a significant effect on Safety Performance.

3.7. Reliability Analysis

Reliability test is used to determine whether the data collection tools or gauges are trustworthy or reliable. This issue is tested using Cronbach α internal consistency and the result will determine the Construct Validity.

A collection of items declared valid and reliable if the value is greater than 0.7. Validity test is done to measure the statements contained in the questionnaire. A statement is said to be valid if the statement is able to express what is about to be disclosed.

4. Conclusion and Implication

Organizational Design affects Safety Climate and Safety Performance. Safety Climate affects Safety Performance, which in parallel also supports Organizational Design in influencing Safety Performance. Safety Performance becomes the mediator of Organizational Design in determining Safety Outcome.

From all sub models tested, it can be concluded that the design of the organization affects positively on Safety Climate, Safety Performance, and Safety Outcome.

Several other factors have been studied by past researchers to determine the relationship between Organizational Design and Safety Outcomes. Most of the factors were used almost consistently for each study. Those factors are Organizational Design and Organizational Performance. On the other hand, the role as a mediator Safety Performance Design Safety Organization in determining outcomes bring a new aspect in the study. Past research can be a reference for developing hypotheses for this study. To prove the hypothesis, further analysis will be undertaken to support the reliability and application of the findings of the past.

As an implication, this study will provide valuable information and important for Aircraft Maintenance Organizations in the field of aircraft maintenance and repair. It will also facilitate management in the recruitment and training of technicians. Therefore, to enhance human resource capabilities, particularly technicians, in the treatment and maintenance of aircraft, concentrating on organizational design is very important. Full trust to the owner of Aircraft Maintenance Organizations in maintaining and repairing their aircraft does not mean the

decisionsare left entirely to technicians in the field. This is because improper design organization will trigger a wrong decision so that if all circumstances are met, the safety outputs in the form of accidents, incidents, and death will appear. As a result, the ability of Aircraft Maintenance Organizations will be questioned so thatit is not impossible the license of aircraft maintenance and repair will be revoked and the organization will collapse.

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