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Civil aviation safety evaluation based on the principle of international civic aviation organization (ICAO): The case of Indonesia

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***Abstract*---**This article analyzes the document and literature relating to civil aviation safety in Indonesia. The commercial airlines has rapidly growth since the government stipulated the open air policy in 2000s. However, the fatal rate accident of aviation simultanously had recently and it made Indonesian airlines were banned by the European Union in 2007. Safety performance of Indonesian civil aviation has been concerned since then. Using international regime approach to assess the country's aviation performance based on the principle of International Civic Aviation Organization (ICAO), this study reveals that although generally the aviation management had already met the standard requirements, there are still several aspects that should be considered as drawbacks that might implicated the fatally accident in the future. This article found the parallel result of reexamination of aviation accident caused by human factor is related to the profile of accident rate toward the safety compliance indicator using International regime of ICAO. The article finally provides some recommendations: increasing safety compliance index and surveillance on the safety obligation, and an aviation policy restoration that includes safety and security components into a

synergetic regulation package to achieve a proper safetytiness of Indonesian civic aviation.

***Keywords*---**civil aviation, ICAO, Indonesia, air safety.

Introduction

Accidents are the most avoided aspects of aviation, especially civil aviation. One of the main causative factors lies in *human error* (Purba Hasim, 2017) . According to the *International Civil Aviation Organization* (ICAO), the annual statistics of aviation accidents show an increase from 2017 to 2018 there has been an increase of 11 percent from various countries (ICAO, 2020) . Commercial flights as *multi million dollars businesses* that adopt advanced but risky technology have become the center of attention of global organizations to improve safety aspects.

The level of commercial aviation accidents in Indonesia is quite alarming. Several fatal accident records include the fall of Adam Air in the waters of Majene in 2007, Garuda Indonesia in the same year in Yogyakarta, Lion Air in October 2018, and Sriwijaya Air SJ182. This condition should be interpreted as an important warning for the Indonesian aviation sector which could be influenced by aviation safety policies and regulations, for example the policy of deregulation of domestic flights in 2000. The government has deregulated aviation business regulations or *open sky policy* which has an impact on opened great opportunities for the world of aviation business in Indonesia at that time (Sicily, 2009) .

The lax implementation of regulations also led to the proliferation of the presence of *Low Cost Carrier* (LCC) airlines, which were pioneered by Air Asia in Malaysia, in 2001. In reality, the quality of services to the public provided by departments and non-departmental government institutions (LPND) is still fluctuating, meaning that there are still ups and downs (Sicily, 2009) . The number of airlines that compete with each other in terms of tariffs and services has increased the number of users of air transportation services. Ironically, the implementation of this policy has a negative impact on the level of flight safety because there is a reduction or limitation of the quality of various aspects, both technical, human resources, and supervision. Referring to an audit conducted by ICAO, *the Federal Aviation Administration* (FAA) as the US civil aviation authority has issued an announcement that aviation safety in Indonesia has dropped from Category I to Category II (INACA, 2019: 36). In fact, since being elected in 1962, Indonesia's status as a member of the ICAO Category III Board can still be maintained until 2001 (Hakim, 2016) .

ICAO is an agency under the United Nations (UN) whose activities are preparing international civil aviation regulations, distributing and monitoring and evaluating their implementation (Susanto & Keke, 2020) . In the *Global Aviation Safety Plan* (GASP), ICAO's targets are to reduce the number of fatal accidents in all countries, significantly reduce *accident rates* , especially in areas with high accident rates, and strive so that no one area has two accident rates. times the global accident rate. ICAO encourages its member countries to make various efforts to achieve *an acceptable level of safety* , so that the number of accidents

can be reduced as low as possible. Currently, ICAO's role has changed to a *Proactive International Regulatory Body* which is not only a standard setter, but also monitors compliance with *the* implementation of the standards that have been set and asks countries to comply with and implement standards that have not been or are not complied with (Susanto & Keke, 2019) .

By becoming a permanent member of the ICAO Council, it is hoped that the Indonesian aviation industry will be encouraged to improve regulatory arrangements, organization, increase operations, and apply technology systems that have an impact on aviation safety management systems. However, in 2007 Indonesia fell to category II, which means that Indonesia is assessed by the FAA as a country that does not meet the requirements of the " *Civil Aviation Safety Regulation* " as determined by ICAO (Hakim, 2016). In FAA regulations, category II means that a country's aviation safety regulations are not implemented properly, their supervision does not meet eligibility, and the aviation regulations are not appropriate and do not meet the standards set by ICAO. In early July 2007, the European Union (EU) also imposed a ban (*ban*) on flying Indonesian airlines. They are prohibited from operating into EU member states (INACA, 2019: 36) . As a result, it took Indonesia 11 years for the EU to lift its flight ban on national airlines. Although finally in mid-June 2018 the EU officially declared to lift its flight ban on all Indonesian airlines (INACA, 2019: 38) .

In the 2016-2019 period, Indonesia's position as a member of the ICAO Board category III was revoked. This has been a blow to Indonesian aviation since its membership in 2001. Several factors may be responsible, such as verification of the national aviation accident rate, implementation of regulations, policies and governance of the Indonesian aviation industry which are not in accordance with ICAO policy standards. The weakness of diplomacy that demands the active role of Indonesian aviation stakeholders is a separate gap in the achievement of national aviation safety (Pangestu, 2020) . The problem is that the management of the aviation industry in Indonesia is still in the form of a sub-system which means it is less professional (Pramedia, 2018) .

The implementation of policies on international flight safety continues to develop and refinement with the aim that the achievement of aviation safety can become an important priority in the aviation community in the world. ICAO's policies as outlined in 19 Annexes and various derivative documents through decisions taken in the General Assembly and Assembly sessions, are policies based on scientific truths that can be accounted for. In principle, ICAO has taken systematic steps with comprehensive supervision of the implementation of Annex 1-19 regulations, both *mandatory* and *recommended* (Susanto & Keke, 2020) . The application of these aviation safety regulations is specifically regulated in ICAO Annex-19 points called the *Safety Management System* (SMS). The current ICAO policy derivatives on aviation safety are interpreted differently by each country according to the principles and policies adopted by the country concerned.

The Indonesian government has implemented the ICAO regulation by enacting Law no. 1 of 2009, Government Regulation on Aviation, as well as other regulations issued by the Ministry of Transportation. In implementing the

regulation, Indonesia uses the CASR (*Civil Aviation Safety Regulation*) form which is equipped with an annex, this form is then referred to as PKPS (Civil Aviation Safety Regulation) as an operational reference for the flight operator. Although most of the CASR material generally follows the FAR (*Federation Acquisition Regulation*) used by America, in principle it still refers to ICAO's recommended standards.

The problem is, an audit conducted in the form of the *Universal Safety Oversight Audit Program* (USOAP) in Indonesia has found gaps in the implementation of ICAO regulatory points, especially with regard to safety aspects . A USOAP audit is an activity in which ICAO assesses the effective implementation of the critical elements (*Critical Elements* / CEs) of the safety control system and conducts a systematic and objective review of the country's safety surveillance system to verify the status of the country's compliance with the provisions of national conventions or regulations and its implementation from ICAO. *Standards and Recommended Practices* (SARPs), aviation safety best practices and procedures (ICAO, 2021) . The eight CEs of a country's safety surveillance system are linked to eight areas that are the focus of ICAO's *Coordinated Validation Mission* (ICVM), namely *Legislation* (LEG), *Organization* (ORG), *Personnel Licensing* (PEL), *Airworthiness* (AIR), *Operations* (OPS).), *Air Navigation* (ANS), *Aircraft Investigation* (AIG) and *Aerodromes* (AGA) (Susanto & Keke, 2020) .

Following up on the world aviation safety program, in mid-October 2017 ICAO conducted a USOAP or flight safety audit in Indonesia directly (*on site*) and indirectly (*of site*) (Krjogja, 2017) . USOAP audits focus on the effective implementation of the eight critical state elements of a safety surveillance system. USOAP audits use a series of protocol questions (*Protocol Questions* /PQs) as a standard tool to assess the level of effective implementation of a country's safety surveillance system (ICAO, 2021) . As of June 1, 2020, ICAO has carried out USOAP activities in 187 member countries, including Indonesia. Through the perspective of ICAO safety regulations, the audit results in general have determined that the level of *comply safety* in Indonesia can reach 82% from 62% above the average global figure or world aviation.

However, that does not mean that the Indonesian aviation safety system does not have a number of problems. Referring to the eight USOAP audit focuses, there are varying results, where the achievements of the USOAP program focus are in each area. which are considered important legislation 71,42 %, organization 69,23 %, personnel license 75,82 %, airworthiness 90,86 %, operation 87,31 % , air navigation 84,88 %, accident investigation 65% and aerodrome 73.38%. Ideally, the conformity between Law no. 1 of 2009 with ICAO should be implemented perfectly because the objectives of the regulation are in line, namely to create safety and security in civil aviation. There are several contributing factors, including the existence of irregularities in the implementation of regulations in the field, low discipline and ignorance of the rules by flight service users, low supervision of aviation safety regulations. In addition, Indonesia does not yet have an Aviation Court to impose legal sanctions on violations of aviation safety regulations.

Based on the problem of civil aviation which is still potentially at high risk, this article evaluates the regulation and implementation of civil aviation in Indonesia based on the principles applied by ICAO. Related research on ICAO was conducted by Button et al., (2004), Huang (2009b), Leib et al (2013) Molasiarani (2017), Achdiat (2017), Wirasatya (2017), ICAO Safety Audit Result (2018), Sky Brary (2018), Primadi (2019), Mahoro (2019), ICAO Safety Documents (2020b), Keke (2020), Sena (2021). They emphasized the safety policy of the ICAO regime which is a condition of compliance for all aviation regulators and authorities.

Meanwhile, Savage (1999), Button et al. (2004), Williams (2009), Wheelen & Hunger (2012), Yadav & Nikraz (2014), Putra (2015), Zerlina et al. (2016), Yarlina & Lindasari (2017), Doc 9859 (2017), Asmah (2017), Nursaini (2018), Hutagalung et al. (2018) Oliveira & Caetano (2019) on the influence of policies on operators of air lines, aircraft, and understanding of airports. Other researchers associate *air safety* with challenges and opportunities, safety cultures, and economics such as Wiegmann & Shappell (2001), Wiegmann et al. (2007), Liou et al. (2008), Dekker et al. (2011), Suprianto (2011), Oster et al. (2013), Egziabher & Edwards, (2013), Clara (2015), Setiani (2015), Hasim (2017), Fiyanzar et al. (2017), Muhtar (2017), Marsden (2017), Jausan et al. (2017), Angeline (2018), Pratikno et al. (2019).

Research related to aviation industry surveillance and regimes was carried out by Browne (1971), Pierre & Peters (2009), FAA (2011), Pradana (2014), Mills (2016), Syafarudin & Mulyana (2019), INACA (2019), Sharif Iqbal (2021). According to them the organizing body under ICAO by itself. From the various existing literature, it can be concluded that in order to achieve a good level of flight safety, a regulatory policy is needed. The policy is expected to obtain an action plan that is oriented to a model of thought on the principles, norms and rules that are mutually agreed upon. This article can be used as a basis for strategic steps in developing aviation regulations in Indonesia that are in accordance with the level of safety. Several questions were asked, among others, how are the efforts to increase regulation in ensuring the safety of national aviation through the perspective of the ICAO regime? How is the breakthrough for testing civil aviation safety regulations in Indonesia from the perspective of the ICAO regime on subjects that are considered competent? Therefore, the urgency of this article is guided by the level and influence of the international regime related to the aviation industry in Indonesia. This article is expected to contribute ideas for academics in the field of civil aviation and international regimes. In addition, this paper produces strategic contributions in the form of transformation of compliance with the Government, the ICAO regime, Indonesian aviation stakeholders, Indonesian civil aviation regulators, the Aviation Industry and other aviation organizations in achieving the level of aviation safety in accordance with ICAO standards.

According to Sudirman (2016), the international regime cannot be separated from a norm. It can be said that the international regime is a gathering place for all kinds of aspirations, desires and plans of each country, but the international regime is still weak if the country is not committed to the agreements made . The policies as formulated in the ICAO annexes need to be derived in the form *of the* GANP (*Global Air Navigation Plan*) and GASP (*Global Aviation Safety Plan*) safety

programs in flight safety operations, which are the flight safety framework within the program (*state safety*). ICAO as a regime has developed principles, norms and rules that require policies and operational controls that can be strongly adhered to in a good *safety framework* . From a compliance perspective, if the *state* cannot implement or cannot comply with certain articles in the ICAO *annexes* , the state should provide a notification to ICAO to be announced through the attachment of the relevant annex. Likewise, with changes or amendments to the *annex* that cannot be complied with, the *state* must notify ICAO within a certain period of time as policy *feedback through state safety* , in Indonesia it is called the *State Safety Program* (SSP).

Starting from the guidance of aviation safety by regulators and operators, it is necessary to consistently apply international standards, such as CASR which is a derivative of *Annex* 1-19 of ICAO regulations and other aviation regulations. In the perspective of the ICAO regime, aviation safety in Indonesia refers to the implementation of segments related to *air safety* . There are several segments of the current *air safety policy* influencing the development of the Indonesian Aviation Safety System, such as improvement in the field of regulation and organizational restoration. This is a step in the development of the compliance index through the *Air Safety System Improvement* towards a level of *safety* ideal flight. The current aviation safety policy in Indonesia is factually a derivative that is comprehensive in nature associated with the roles of stakeholders, regulators and operators. The implementation of ICAO policy derivatives is actually in the regulatory *framework as a representation of the state* 's compliance in adopting ICAO regime policies that are in line with *existing conditions* in Indonesia.

Literature Review

A regime is a complex of ideas that arises or is formed from a dependence on the importance of norms, principles, rules and *decision making procedures* . (Sudirman, 2012) . An international regime is basically a form of international cooperation formed on the basis of institutionalized principles, norms, rules and decision-making procedures. Although not fully formalized or structured (Sudirman, 2016) . The regime is seen as a means of cooperation between countries that can lead to common goals and increase transparency between countries. The existence of an international regime can also help countries work together to gain collective benefits in the form of security and stability (Hasenclever et al., 1997) . In other words, the international regime is an abstract object in which it is in the form of power or power which will later produce a norm or regulation that is ratified or legitimized by the policy makers involved in order to achieve a common interest of a group of countries concerned.

International regimes are formed because of the fear of a country to be cheated and exploited by other countries causing the emergence of cooperation within the regime itself (Hasenclever, 2000) . In several studies on regimes, there are three main views that discuss the dynamics of cooperation within a regime, namely *neoliberalism, realism, and cognitivism.* (Hasenclever et al., 1997) . The first view is to think that international regimes can be a solution and help a country in achieving its interests stated by *neoliberalism* . The state is considered a rational actor who is selfish because it only cares about the interests and *absolute gains* of

a regime (Hasenclever et al., 1997) . The second view is realism with several figures including Gilpin, Krasner, and Grieco who say that *power* still has the same big role in both cooperative and conflict situations (Hasenclever, 2000) . Therefore, the theory of hegemonic stability was born which assumes that the regime is a collective form of international cooperation, which is only effective if there is a dominant actor in it. In this view, the regime is only effective when the partisans in it benefit from each other in a balanced way.

The distribution of capabilities among actors critically affects both their effectiveness in terms of emergence and persistence in a particular issue area and also affects the nature of the resulting regime, especially as far as the allocation of benefits from the cooperation concerned (Hasenclever et al, 2000:9). According to Young (1982: 284), two types born from this category are first *, overt hegemony* which refers to the actions of hegemonic actors that are open without manipulating subordinate actors. The second type is *de facto imposition* which is the opposite of *overt hegemony* . The third view is *cognitivism* . The birth of cognitivists stems from a critique of *neoliberal* and *realist views* which assume that the preferences and options of existing actors are only temporary because there are variations in international behavior. The cognitive approach in the study of international relations emphasizes ideas and knowledge as variables of emphasis where cognitivists are critical of rationalist theory (Hasenclever et al., 1997: 136; Krasner 1983c: 19). Haas in Hasenclever et al. (1997) . The cultivation of existing norm values can make the State act rationally to fulfill its national interests.

In its development, there are differences between the notions of international organizations *(international organizations*), international institutions *(international institutions)* , and international regimes *(international regimes).* (Satnyoto, 2017) . One of the phenomena of the development of international organizations, institutions and regimes is in the regime of international cooperation in international civil aviation. Henkin (1968: 36) states that states feel compelled to comply with agreed norms and rules, even when they have the incentive to violate them and the capacity to do so. This is explained by reference to the “sense of duty” that encourages states to respect international treaties regardless of positive or negative sanctions. It is in this sense that norms and rules can be said to exert "their own pull of compliance" (Franck 1990), their binding force irreducibly to the instrumental rationality of interacting agents. As a result, ignoring these independent sources of compliance cannot help but produce a distorted picture of international relations. According to Chayes and Chayes (1993: 201) the perspective on international norms and rules is very important because it has considerable policy implications.

Henkin (1968: 32) states that general respect for norms and rules is “the price of membership in the international community and having relations with other countries.” According to Henkin, governments recognize their dependence on a normatively organized international system, whose principles allow for the peaceful and orderly exchange of goods and ideas. Because states need the international community, they respect the needs of this community. Among other things, compliance with treaties is essential, for no society can exist without a common belief that the obligations incurred by its members are respected (Bull

1977). Therefore, nations and the people who govern them have a "common interest in keeping society running and maintaining order in international relations." " (Henkin 1968: 48; see also Franck 1990: 37; Hurrell 1993: 59) in (Hasenclever et al., 1997) .

In connection with the need for inter-state cooperation in international regimes, the epistemic community is 'a relevant channel of new ideas circulating from society to government and from country to country' (Haas 1992b: 27). The epistemic community can be thought of as a respected watchdog of policy-relevant knowledge in a world of increasing complexity. Because of their transnational links, experts can communicate new ideas and policy innovations to their counterparts in other countries which will ultimately influence their governments. (Hasenclever et al., 1997) . It is in principle that the more the epistemic community is mobilized and able to gain influence in their respective nation-states, the more likely it is that these nation-states will in turn exert power in the name of the values and practices promoted by the epistemic community and by thus will assist in international institutionalization (Adler and Haas 1992: 371 and Hasenclever et al., 1997: 153) .

From various expert opinions on international regime theory, there will be many births and the formation of regime institutions and organizations in the world in various fields, one of which is the regime in the field of international aviation (ICAO). Based on the perspective and perspective of the international regime, it can be said that the ICAO aviation regimes, in this study, are closer to the cognitivism perspective. This perspective emphasizes international relations that have interactions to form patterns and rational groupings that are obtained through the contribution of ideas from epistemic circles. The Civil Aviation Safety Management System in Indonesia indicates the need for a new design and formulation of thinking in improving aviation safety in accordance with the relevance of the rules desired by the ICAO regime for the relevant actors.

The views that come from the thoughts of Grotian (giving birth to the views of idealists) and Kantian have influenced the thinking of international organizations and regimes (Satnyoto, 2017) . The Grotian group considers that the international community is not merely in an anarchic situation, or on the contrary, is a fully harmonious society, members of the international community consist of governments or countries, consciously accept the existence of the same values and interests, accept the same rules of the game. and are involved in the same various institutions (Satnyoto, 2017) . From a Gotian perspective, it can be said that international cooperation is governed by norms, principles and rules that are mutually agreed upon and adhered to. This perspective recognizes the importance of state actors in international politics. In order to see the types of institutions or regimes produced in international cooperation, Donnelly (1986) categorizes them based on the rules or norms of regimes or institutions that are national (tends to be weak) if international (tend to be strong). The international civil aviation regime (ICAO) is included in the *Enforcement International Regime category* , which is a regime that has rules, norms, principles and decision-making that apply to all its members, and must be implemented and obeyed according to joint conventions, and allows this regime to provide *punishment* . punishment) for each member who violates or does not comply with mutually agreed policies and regulations.

The ICAO definition of safety is a situation in which the risks associated with aviation activities, associated with, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level (Doc 9859, 2017: viii) . In this regard, ICAO uses other terms such as SMS which is a systematic approach to managing safety, including organizational structure, accountability, responsibilities, required policies and procedures, and the *State Safety Program* (SSP) (ICAO, 2020b) . The concept of SMS according to Cooper (2003) is defined as a systematic framework on which policies, objectives, strategies, implementation, planning, resources, risk assessment, implementation, monitoring and performance measurement, auditing, and reviewing can be handled coherently.

Roelen and Klompstra (2012) define safety as freedom from unacceptable risk, risk is a combination of the probability of a hazard occurring and the severity of the hazard. *Harm* is physical injury or damage to a person's health either directly or indirectly as a result of damage to property or the environment (Klompstra, 2012). Safety also has a probabilistic aspect, and this is one of the reasons why subject safety is difficult to measure, because the absence of a hazard does not necessarily indicate a risk (Fiyanzar, 2016). Safety is critical to the existence of civil aviation, which is one of the main drivers of the fast-growing global economy . Therefore, the integration of aviation management bodies is very dominant in determining flight safety (Stolzer, 2015). Dillingham (2007) states that establishing a supervisory body is a standard method of regulation for aircraft operators , and is the scope of the regulation important for the improvement of aviation safety around the world and therefore requires intense coordination between aviation management bodies (Mwikya N. K., 2018).

Liou et al. (2008) argued that improving aviation safety has always been a top priority for the aviation industry, and adopting a safety agenda that is considered essential to the growth and success of (Mwikya, 2018)any airline . In PP. 3 of 2001 concerning Aviation Security and Safety provides an understanding of flight safety as a condition that is manifested by flight operations that embody orderly, orderly, safe, secure, comfortable flight operations, at reasonable prices, and avoid unfair business competition practices; smoothly in accordance with operating procedures and technical feasibility requirements for aviation facilities and infrastructure and their supports (Tulusan & Dengo, 2018) .

The concept of aviation safety *(air safety*) is very relevant to international regimes, for example aviation safety must pay attention to and fulfill the security requirements for the use of air space, aircraft operations, and all supporting facilities, as regulated in ICAO regulations Annexes 8 and 9. regulatory policy in Annex 8 (*Airworthiness of Aircraft*) which regulates airworthiness standards and aircraft inspections which must have the same procedures in all civil aircraft flight activities, and at all airports in Indonesia. Meanwhile, the policy of the ICAO regime in Annex 9 (*Facilitation*) regulates the standard provisions for airport facilities that support the smoothness and entry of aircraft, passengers and cargo at the airport. According to Heinrich's domino theory, Boeing adopted the concept of an "accident chain" to describe the accident process caused by a series of real events. By disconnecting any link in a chain, possible accidents can be prevented. Another well-known and similar theory is the so-called cheese model. When the

holes of each piece of cheese are aligned, the light will pass through all the pieces of cheese which indicates that the accident process has been completed (Hung Sying Jing, 2015) .

Research Method

This research uses a qualitative approach with the method of studying literature and documents about the condition of civil aviation in Indonesia, especially in the last two decades. Descriptive analysis is used to determine the condition of the civil aviation industry and various supporting parties that contribute to the regulation of civil aviation safety in Indonesia. In this case, the researcher looks at how behaviors, perceptions, motivations, actions and others lead to efforts in realizing a comprehensive increase in civil aviation safety regulations in Indonesia.

Based on an assessment of the aspects studied, this research covers the subject of how regulatory policies are in order to improve the safety of civil aviation in Indonesia. Data on the topic was obtained by collecting various documents from the report archives and documents directly related to the object of research. Secondary data searches were also obtained by studying the study of laws, media aviation regulations, journals, writings and various literatures from books, scientific manuscripts and related research reports. The data sources of this research are Ministry of Transportation officials, KNKT officials, ICAO Regional officials, Indonesian Civil Aviation Operators (Garuda and Lion Air). While the object of this research is ICAO Regional, Ministry of Transportation, PT. Garuda Indonesia Airways, PT. Lion Air Group, KNKT, PT. GMF, *Vendors* and *Stakeholders* with an observation unit, namely the management of the company.

Results and Discussion

Derivation of Aviation Regulation Policy in Indonesia

The derivation of aviation regulatory policies in Indonesia is a series that is systematically derived from ICAO regulations based on the rules and principles of compliance in ensuring the implementation of policies that are passed on through the relevant agencies. Using the regime's perspective, the civil aviation safety policy in Indonesia is formulated based on *a safety framework* through the four pillars of *safety and operations* into *annexes* so that the objectives are in line with the USOAP program. Fundamentally, the 19 ICAO Annexes were then reduced to two safety-oriented policy programs, namely the *Global Air Navigation Plan* (GANP) *and the Global Aviation Safety Plan* (GASP), then GANP was included in the definition of the *Safety Management Manual* (SMM). In addition, ICAO continues its regulatory policy by providing SMM regulation stimulation in the form of a *Global Air Traffic Management Operation Conceptual* (ICAO-GATMOC). As part of a global aviation actor, Indonesia has regulations in adopting national aviation safety policies and programs based on laws, government regulations, ministry regulations and other rules that are integrally technical.

In order to ensure Indonesia's compliance with ICAO SARPs, Indonesia is committed to following developments in international civil aviation standards and

regulations according to the ICAO *State Letter* . In the Aviation Law, aviation as a mode of transportation cannot be separated from other modes of transportation which are regulated in a high-tech national transportation system and require a high level of safety. Safety and security (aviation) is an important part of the purpose of organizing domestic flights. Article 1 number 48 of the Law of the Republic of Indonesia Number 1 of 2009 defines *aviation safety* as "a condition of meeting safety requirements in the use of airspace, aircraft, airports, air transportation, navigation, aviation and supporting facilities and public facilities. others" Article 1 number 48 of the Law of the Republic of Indonesia Number 1 of 2009 concerning Aviation.

Based on Article 1 of the Chicago *Convention* 1944 that every State has full and exclusive sovereignty over the air space above its territory. This principle has been stated in the provisions of Article 5 of Law Number 1 of 2009 concerning Aviation, that Indonesia has full and exclusive sovereignty over airspace and therefore has full authority to secure airspace for the benefit of aviation defense and safety. Considering that safety and security are part of the operation of transportation, the arrangements have also been revised. In the Law of the Republic of Indonesia Number 1 of 2009, safety and security during special flights on aircraft is regulated regarding Airworthiness and Aircraft Operation. Then regarding aviation safety which includes programs, supervision, law enforcement, management and safety culture, it is regulated in a Ministerial Regulation regarding safety and security in aircraft.

Compliance Index in Indonesia against Global

The Indonesian government has prioritized aspects of flight safety and security for Indonesian airlines. Law Number 1 of 2009 concerning Aviation has stipulates that the 4 components of the ICAO-SMS framework have contained elements of a compliance source component. The Aviation Safety Policy in Law No. 1/2009 (*State safety policy, objectives, and resources*) uses 5 (five) objectives and compliance compliance references including aviation laws, operator regulations, state systems and functions, qualified technical personnel, and availability of technical guidelines, equipment, and critical safety information. in Law No. 1/2009 (*State safety risk management*) uses 5 (five) goals and references, including certification, license, authorization, and approval obligations. Safety management system, accident investigation, hazard identification and safety risk assessment, and safety risk management.

Aviation safety assurance in Law No. 1/2009 (*State safety assurance*) uses 4 (four) objectives and references for compliance compliance: supervisory obligations, monitoring the performance of safety service providers, safety performance conditions, and change management. National aviation safety promotion (*State safety promotion*) uses 2 (two) objectives and references for compliance compliance: communication and dissemination of information both internally and externally. In accordance with ICAO- *Global Aviation Safety Plan* regulatory policies related to flight operations, to find out the *safety compliance index* can be achieved effectively overall (*ideal target safety compliance* = 100%) if this is a representation of what is being targeted (explanation of point 1 above) in achievement of goals (explanation of point 2 above) can be translated in the form

of an *index of the target indicator* approach (qualitative analysis). In terms of ensuring *existing conditions,* a *target indicator value* for the *safety compliance index* can be identified through the evaluation of the management of flight operational safety performance monitoring in each ICAO member country, which evaluates the performance of the *input* and *output* of flight operational safety.

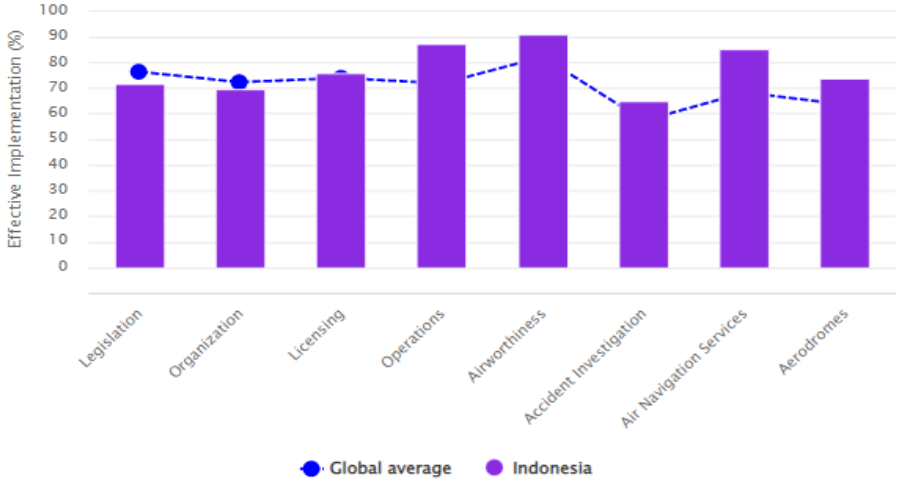

Figure 1.Compliance Index in Indonesia

The evaluation method for monitoring input performance management can be identified by using the *global safety audit* /ICAO-USOAP method on a series of *critical element performance indicators* . Meanwhile, the management of monitoring the performance of *output performance* can be known through *state safety monitoring* / Indonesian SSP- *safety monitoring* , namely to ensure the availability of *safety enhancement elements* . In other words, the researcher interprets comprehensively that the existence of target indicator tools in a flight operational control management can be identified through 2 (two) patterns of evaluation tools that have a directly proportional relationship in producing the value of a *safety compliance index* . In this case, where the pattern of tools 1 is carried out by ICAO itself while the pattern of tools 2 is carried out by the SSP in Indonesia. The graph in the image above shows the level of achievement in each field which are considered important Legislation 71.42%, Organization 69.23 %, Personnel License 75.82 %, Airworthiness 90.86 %, Operations 87.31 % , Air Navigation 84.88 %, Accident Investigation 65% and Aerodrome 73.38%.

Evaluation of the Implementation of Civil Aviation Safety Regulations in Indonesia in accordance with the ICAO Regime

Indonesia's involvement in the ICAO forum is part of strategic steps in efforts to develop the world of Indonesian aviation in the international aviation arena. This step is carried out through efforts to strengthen and develop Indonesia's cooperation with the Secretary General of ICAO. Efforts to improve Indonesia's image in the progress of developing the Indonesian civil aviation sector at ICAO and the international community, efforts to promote the progress of Indonesian civil aviation, following developments in international civil aviation standards

and regulations. To realize these aims and objectives, the Office of Indonesian Interests was established at ICAO. The inauguration of the Indonesian Interest Office at ICAO was carried out by the Deputy Minister of Transportation of the Republic of Indonesia.

The Indonesian Representative Office for ICAO comes from the Ministry of Transportation which has an important role in bridging Indonesia's interests in the field of civil aviation with ICAO, especially regarding the latest developments in aviation safety and security in the international world. In addition, the existence of the office also plays a role in providing data and information to ICAO and other ICAO members regarding the policies of the Government of Indonesia in the field of Indonesian civil aviation . The Indonesian government still opened the Representative Office even though Indonesia was not re-elected as a member of the Council of ICAO in 2001 until it was decided to close. However, Indonesia has again collaborated with ICAO through The Declaration between the Government of the Republic of Indonesia and the International Civil Aviation Organization on Enhancing Aviation Safety in Indonesia which was signed in Bali. This declaration emphasizes on: (a) the importance of both parties working together and strengthening the safety oversight capacity of aviation (safety oversight capacity), (b) providing the necessary financial support and resources, (c) implementing a national aviation safety program. , including safety management systems, implementation of transparency, development of safety culture, and (d) Dissemination of relevant data on aviation safety.

As a follow-up to the signing of the Bali Declaration, ICAO and the Government of Indonesia have entered into an agreement in the form of a *Management Service Agreement* (MSA) consisting of 4 Annexes signed by the Secretary General of ICAO and the Director General of Civil Aviation of the Indonesian Ministry of Transportation, namely: (a) MSA Annex 1 regarding *Enhancement of Safety Oversight Capability of the Indonesian Directorate General for Civil Aviation* (DGCA), (b) MSA *Annex 2* on *Civil Aviation Transformation Team* (CATT) *for Impementation of Civil Aviation Strategic Action Plans* (CASAP), (c) MSA *Annex 3* on *Upgrading of Civil Aviation Training* , (d) MSA Annex 4 on *Assistance to the Representation of Indonesia to the International Civil Aviation Organization* . Strengthening the structure and institutional capacity of the Government of Indonesia in handling civil aviation is an important element in accordance with ICAO policies which are summarized in ICAO's USOAP program. The realization of strengthening the structure and capacity of the institution is through the MSA Annex 4 program regarding ICAO support and assistance to reopen the Office of Indonesian Interests at ICAO in 2010. by ICAO, the Final Agreement of Lease of Offices of Indonesian Interests at ICAO has been initialed by Indonesia (KBRI Ottawa) and Landlord (Societe de Gestion COGIR senc) and signed by Indonesia on 12 September 2011 and Landlord on 23 June 2011 for the term of office lease for 10 years.

In the world of aviation, *compliance* with high *safety standards* is an obligation that must be fulfilled by the Indonesian government. Aviation *safety* needs to be implemented in all sectors, both in the fields of transportation/air transport operations, airports, navigation, maintenance and repairs as well as training that refers to the rules of the *International Civil Aviation Organization* (ICAO). Basically,

by complying with applicable safety procedures, it can improve flight safety so that a safe, comfortable and safe flight can be created. Aviation and air transportation activities have a prominent international character, both from the commercial economic aspect and the regulatory aspect.

It can be understood that CASR is important as an operational regulation in describing the technical derivative of what is understood through the ICAO perspective. The CASR component is currently partitioned into several *parts* with elements related to flight safety control. As a regulation that refers to the FAR format (*Federal Aeronautical Regulations*), Indonesia's CASR is still stratified at a low level compared to the operational regulations of other countries. The current overview of CASR is divided into eight groups of important implementation rules, including general areas for Parts 1-6, Airwothiness for parts 7-17, maintenance for parts 18-19, registration for parts 21-22, and technical approval for parts. 23-24, Certification for parts 25-37, Traffic Rules for parts 38-42 and *Traffic Services Management* for parts 43-44

The implementation of CASR in Indonesia is in line with the development of ICAO

ICAO 's strategic objectives for the period 2005-2010 include *Safety, Security, Environmental Protection, Efficiency, Continuity,* and *the Rule of Law* . The *safety* and *security aspect* is meant to improve the safety and security of global civil aviation. The five strategic objectives were condensed into three periods of 2011-2013, namely *Safety, Security, and Environmental Protection and Sustainable Development of Air Transport.* In terms of *Safety* and *Security ,* there is no change. The application of the Law is also clarified by various other regulations such as Presidential Regulation (PP No. 3 of 2001), Decree of the Minister of Civil Aviation (KM. 09 of 2010), as well as several Decrees of the Director General of Civil Aviation.

In most scenarios, systemic problems become evident playing a significant role in the decline in performance water safety in Indonesia . Systemic problems In general, it is closely related to a series of organizational management procedures related to the implementation of *water safety* aspects . There are details of systemic problems, namely: (1) air safety planning must work for the Indonesian state by implementing and developing a State Safety Program, (2) air safety planning implementing a safety management system into flight operators, (3) air safety planning must be oriented to safety collaboration. management system, and (4) air safety planning must represent complexity as a system. Regarding *operational issues* , air safety issues in aviation operational activities in Indonesia can be identified through reporting and analysis of incident data. Planning Safety in Indonesia should begin by addressing the major safety risks affecting commercial air transport, particularly those carried out by aircraft.

In operating activities of commercial air transportation by aircraft, air safety issues have been organized into five different categories, which are the various ways in which accidents and a serious incident occurred. This event is irreversible and represents the final state in sequence of events that develops into a safe event. Before they occur, it is usually air safety problems that can be remedied by

increasing the safety margin . In the context of a low performance safety risk management analysis approach due to safety policy vs safety margin, increasing safety margin is the right solution to reduce the high potential for aircraft accidents in Indonesia.

In Indonesia, the *human element* is still the dominant factor in cases of civil aircraft accidents. In the past 5 years, it can be seen that the causative factors in Indonesia from 2015-2020 can be seen in the picture below:

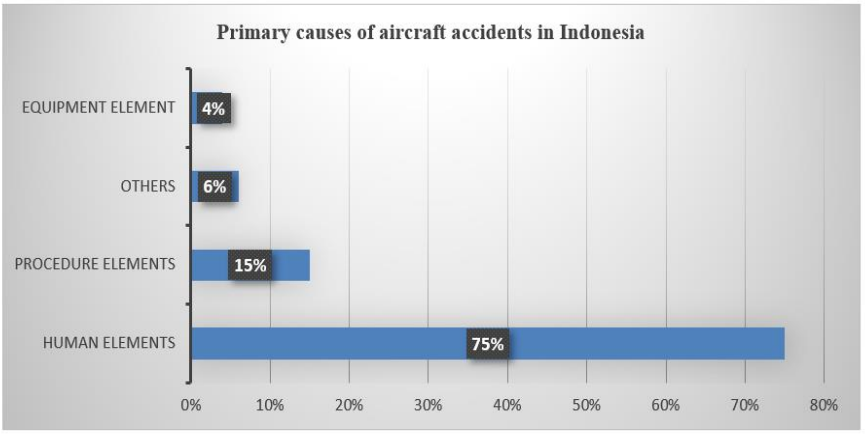

Figure 2. Causes of accidents in Indonesia in 2015–2020

From the data above, it can be analyzed that the significant cause of commercial airplane accidents caused by the human element is 75%. It can be understood together that the human element is a combination of the causes of aircraft accidents which are also caused by non-compliance with a series of *procedure elements* . The cause of airplane accidents from the human element occurs because the regulatory policy for safety aspects (*safety policy*) does not comprehensively describe how the benefits of regulation as a preventive catalyst for improving *human performance.*

According to the type, the factors for the occurrence of accidents have several important elements including CFIT (*Control Flight In to Terrain*), LOC (*Loss Of Control*) and RS (*Runway safety*). Based on the data, the CFIT and Hospital sectors are still a scourge that significantly affects the occurrence of accidents in Indonesia, both classified as fatal (*total loss*) and mild. The types of aircraft accidents in Indonesia from 2015-2020 can be seen in the image below:

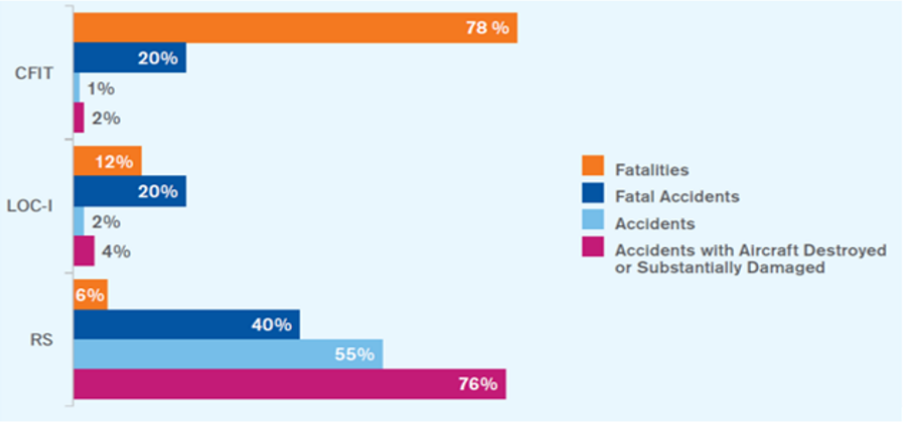

Figure 3. Types of accidents in Indonesia in 2015–2020

The results of the Investigation of the Number of Air Transport Accidents in 2015 – 2019 and 2020, the year the Covid-19 pandemic has entered Indonesia, states that in 2015 there were 28 accidents and the number of deaths was 65 people and the number of injured was 10 people. In 2016 the number of accidents was 45 and the number of victims died was 5 people and the number of injured victims was 13 people. In 2017, the number of accidents was 37 and the number of victims died was 6 people and the number of injured victims was 21 people. In 2018, the number of accidents was 44 and the number of victims died was 199 people and the number of injured victims was 5 people. In 2019, the number of accidents was 30 and the number of victims died was 5 people and the number of injured victims was 6 people. In 2020, there were 22 accidents and 2 people died and 5 people were injured. The data can be seen in the following graph

Figure 4. Graph of victims of plane crashes in Indonesia

From the explanation above, researchers can identify lessons learned regarding policy and compliance performance evaluation, namely: The effectiveness of

ICAO's policies can be evaluated based on a series of analysis of aircraft accident data. The effectiveness of ICAO's policies is functionally effective when its compliance aspects are complied with by its members, including Indonesia. Aviation safety is a condition where a flight runs smoothly from takeoff to landing at its destination with no accidents or incidents. The definition of accidents and incidents used internationally in the world of aviation refers to the definitions contained in Annex-19. Furthermore, based on the results of the research finally gave birth to a new theory, related to the examination of aircraft accidents, which were caused by *human factors* associated with the *accident rate profile of accidents* that occurred to *safety . compliance indicator* using the international regulations of the ICAO regime, has a directly proportional relationship.

In other words, the derivatives of the plane crash examination theory are as follows: First, the *human factor* as an actor determining *compliance indicators* on whether all international aviation regulations of the ICAO regime have been implemented in flight operational activities based on the ICAO-SMS Framework. Second, *the critical element* in human factors *is the cognitive science aspect* , namely how to think cognitively to prevent airplane accidents by increasing compliance behavior with the ICAO regime's international flight regulations. Specifically, for emerging issues related to the effectiveness of a set of regulations, see the schematic below:

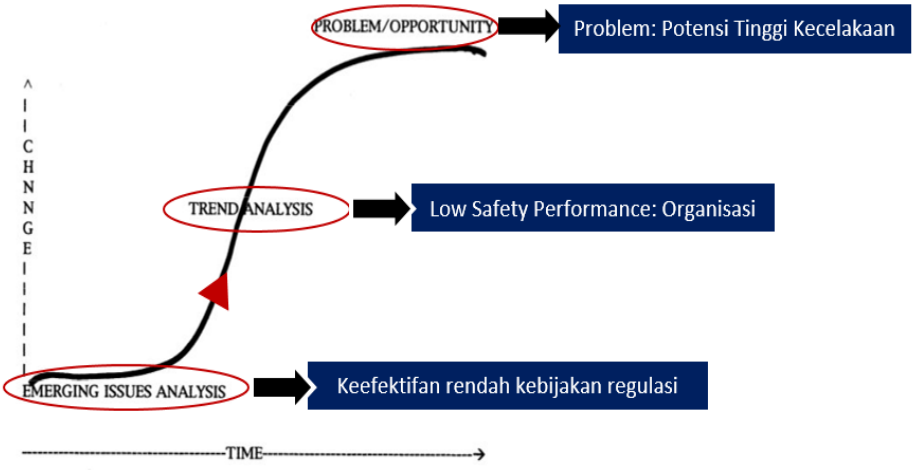

Figure 5 . Schematic of the Problem of the Effectiveness of Regulatory Policies

The use of a flight technology advancement system that is based on predictive safety risk prevention is not optimal in relation to operational activities in all flight operators. In addition, there are no efforts to eliminate the direct impact of environmental damage resulting from the operational activities of each flight operator. A set of aviation regulatory policies and the provision of professional human resources and specialized expertise to manage the safety management system need to be reviewed for their effectiveness.

Conclusion

Aviation safety is a major factor in every flight operation. Creating safety, security, and smooth air traffic has become a shared commitment of every business actor in the aviation industry. Based on the document issued by the International Civil Aviation Organization in *ICAO Doc.9859* concerning *Safety Management Manual* (*SMM*), in aviation operations, safety is a condition in which the risk of loss or damage is limited or reduced to an acceptable level, which is the business and responsibility of everyone, not theory but practice goes through an ongoing process of identifying hazards, managing risks and expectations of performance.

In Law 1/2009 concerning *Aviation* , aviation security and safety has a very important and strategic role in flight operations, so that its implementation and development is controlled by the State whose implementation is carried out by the government in a unified civil aviation security and safety service system. Aviation safety is matters relating to aviation security and safety, investigation of aviation accidents and prevention of aviation accidents through the improvement of CASR in Indonesia, equivalent to the law. Indonesia has been a Member of *ICAO* since 1950 and has been a member of Council Part III from 1962 to 2001. Through the 38th *Assembly Session in 2013 Indonesia has submitted a nomination for a member of Council Part* III. The 38th *Assembly* Session of the International Civil Aviation Organization (*ICAO*) has elected *Council members* . Members of the *Council* comprising 36 Member States are the governing bodies of the Organization and are elected for a term of three years. Safety and security in aviation are two different domains. In the Law of the Republic of Indonesia Number 1/2009 concerning Aviation, the definitions of safety and security are clearly distinguished.

Based on the interests of state policy towards civil aviation in Indonesia, it is based on ICAO's policy formulation which is used as one of the benchmarks in the progress and development of an ideal flight safety system. Based on ICAO's policies as outlined in its audit program, the state (Indonesia) has taken various comprehensive steps in order to achieve a level of compliance with existing regulations. An audit for safety *is* known as the *USOAP (Universal Safety Oversight Audit Program)* while an audit for security *is* known as the *Universal Security Audit Program (USAP)* . Furthermore, Indonesian aviation stakeholders must continue to strive to gain world recognition for the country's aviation safety through *ICAO 's strategic program in* order to meet international standards. Including the desire to carry out policy restoration in pouring safety and security into a synergistic container in achieving a more adequate level of safety. Learning from many cases of accidents as the causative factors mentioned above, the state must be able to make positive breakthroughs so that the chaos of national aviation supervision can really be properly resolved.

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