Aircraft Accident Investigations: Tension Between Technical and Judicial Investigations

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Abstract

The main objective of an aircraft accident investigation is to find out the most probable causes of such accident. This represents a technical investigation in nature. At the practical level, however, this report is often used as legal evidence before a court. In common law countries, technical investigations take priority, unless there is a strong suspicion of a criminal act such as terrorism. Meanwhile, countries with civil law (Napoleonic Code) systems prioritize judicial authorities' investigations. This paper argues that the main purpose of an aircraft accident investigation is technical in nature and judicial investigation are necessary only when the technical investigation finds elements of crime that has been alleged as the most probable cause of the accident.

Keywords: *aircraft, accident, investigation.*

I. INTRODUCTION

Safety is a fundamental element of air transportation. Numerous aviation regulations have been promulgated aimed at meeting safety standards. Article 44 of the Chicago Convention of 1944 (hereinafter referred to as the "Chicago Convention") states that the main objective of establishing ICAO (International Civil Aviation Organization) was 'to insure the safe and orderly growth of international civil aviation throughout the world.'

The word 'safety' means 'freedom from danger or risks'.[1] At a practical level, however, there is no guarantee that a flight will be completely free from risks. On this basis, Wassenbergh defines aviation safety as 'no (avoidable) accidents' or in a more realistic sense as 'few accidents as possible'.[2] The ICAO Air Navigation Commission provides a more comprehensive definition as, the state of freedom from

1 Lesley Brown, ed., *The New Shorter Oxford English Dictionary, Vol. 2* (Oxford: Clarendon Press, 1993), 2666.
2 Henri Wassenbergh, "Safety in Air Transportation and Market Entry," *Journal of Air and Space Law* 23, no. 2 (1998): 74–81, 74.

unacceptable risk of injury to persons or damage to aircraft and property."[3]

Safety is the main objective of all aviation activities, and civil aviation in particular. The ICAO is the international institution responsible for the establishment of safety standards required of all aviation operators. Safety standards are achieved through the establishment of technical parameters and comprehensive regulations. The most important role of safety regulations is to ensure that technical safety standards are properly applied by all parties involved in aviation activities. The combination of highly technical standards and comprehensive regulations make air transportation the safest mode of transportation.

One of the means of meeting safety standards in aviation is the obligation of States to conduct aircraft accident investigations. Article 26 of the Chicago Convention stipulates that the state in which the accident occurs will institute an inquiry into the circumstances of the accident, in accordance with and to the fullest extent its law permits.[4] The core objective is to find out the proximate causes of such accidents to prevent similar future accidents and provide data and information for creating systems and technology that meet the required safety standards.[5]

Unlike other modes of transportation, air transportation accidents occur infrequently. However, when air crashes do occur, they are catastrophic, often causing fatalities. Many aircraft have crashed in Indonesia. For example, the crash of the Sukhoi Superjet 100 that was on a joy ride around Mount Salak in 2012, was a catastrophic aircraft accident in Indonesia.[6] Later, an Air Asia plane crashed in the Karimata Strait in early 2015, killing 162 passengers including its cabin crew.[7] The crash of Lion Air in 2018[8] and Sriwijaya Air in 2021,[9] which also killed all the passengers and cabin crew.

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3 See ICAO Working Paper AN-WP/7699, 11 December 2001, paragraph 22. See also C.O. Miller, "State of the Art in Air Safety," *Journal of Air Law and Commerce* 34, no. 3 (1968): 343–55, 347.

4 Article 26 Chicago Convention 1944 states as follows: 'In the event of an accident to an aircraft of a contracting State occurring in the territory of another contracting State, and involving death or serious injury, or indicating serious technical defect in the aircraft or air navigation facilities, the State in which the accident occurs will institute an inquiry in the circumstances of the accident, in accordance, so far as its laws permit, with the procedure which may be recommended by the International Civil Aviation Organization'.

5 Paul Stephen Dempsey, "Independence of Aviation Safety Investigation Authorities: Keeping the Foxes from the Henhouse," *Journal of Air Law and Commerce* 75, no. 1 (2010): 223–84, 223.economic, punitive, and reputational effect upon individuals, airlines, manufacturers, air navigation service providers, airports, maintenance companies, and governmental institutions. Hence, many institutions and individuals are motivated to try to influence the outcome of the investigation. Article 26 of the Chicago Convention requires a State in which an aviation accident occurs (involving death or serious injury, or involving a serious technical defect in the aircraft or air navigation facilities

6 Balqis Fallahnda, "Kronologi Kecelakaan Pesawat Sukhoi Di Gunung Salak Tahun 2012," tirto.id, accessed 16 September 2021, https://tirto.id/kronologi-kecelakaan-pesawat-sukhoi-di-gunung-salak-tahun-2012-f9df.

7 Reska K. and Niskanto, "Analisis Lengkap Kecelakaan AirAsia QZ8501," Kompas.com, accessed September 16, 2021, https://tekno.kompas.com/read/2015/12/04/08090077/ini.analisis.lengkap.kecelakaan.airasia.qz8501?page=all.

8 Danu Damarjati, "Tragedi Oktober 2018: Lion Air Jatuh Di Perairan Karawang," detik.com, accessed September 16, 2021, https://news.detik.com/berita/d-4362475/tragedi-oktober-2018-lion-air-jatuh-di-laut-karawang.

9 Cantika Adinda Putri, "Penyebab Jatuhnya Sriwijaya Air SJ 182 Diungkap Sore Ini," cnbcindonesia.com, accessed September 16, 2021, https://www.cnbcindonesia.com/news/20210210131118-4-222429/penyebab-jatuhnya-sriwijaya-air-sj-182-diungkap-sore-ini.

Compared to the accidents experienced by other modes of transportation, aircraft accidents generally receive wide and serious attention, not only in the country where they occur, but also internationally. For example, the media exposure of the aircraft accidents experienced by Malaysia Air in 2014, namely the downing of MH 370, the location of which remains unknown, followed soon by the downing of MH 017 in the Ukraine.[10]

Speculations always arise after accidents, from the probability of mechanical failure to pilot error. There are even those who speculate whether crime, particularly terrorism, are involved. All the speculation is acceptable. However, the validity of any theory should be confirmed through investigation. The important question is, what is the main purpose of an investigation following an air crash? The main purpose of an air crash investigation is to find out the most probable cause. Stephen Dempsey argues that 'the cause of an aviation catastrophe consists of the omissions, events, conditions, or a combination thereof which led to the accident or incident'.[11] In other words, this is a technical not judicial (legal) investigation. In practice, however, this investigation can turn into a judicial investigation that is intended to find out the liability of the parties.

This article discusses three main issues: first, what are the functions and objectives of air accident investigations in international air law? second, what is the relation between technical investigations and judicial investigations in air crash investigations? and third, what is the most appropriate form and mechanism for investigating air crashes in Indonesia that complies with both Indonesian and international air laws?

II. ACCIDENTS

As a precursor to understanding air crash investigations, it is necessary to explain the term 'accident' as it is a precondition for conducting an aircraft accident investigation. In addition, the term 'incident' is also used in such investigations. Annex 13 of the Chicago Convention (hereinafter referred to as Annex 13) defines

10 "MH17 Ukraine Plane Crash: What We Know," BBC News, accessed September 16, 2021, https://www.bbc.com/news/world-europe-28357880.

11 Dempsey, "Independence of Aviation Safety Investigation Authorities: Keeping the Foxes from the Henhouse"economic, punitive, and reputational effect upon individuals, airlines, manufacturers, air navigation service providers, airports, maintenance companies, and governmental institutions. Hence, many institutions and individuals are motivated to try to influence the outcome of the investigation. Article 26 of the Chicago Convention requires a State in which an aviation accident occurs (involving death or serious injury, or involving a serious technical defect in the aircraft or air navigation facilities, 226; Francis Schubert, "Legal Barriers to a Safety Culture in Aviation," *Annals of Air and Space Law* 29, no. 1 (2004): 19–66; Annex 13 of the Chicago Convention: "The sole objective of the investigation of an accident or incident shall be the prevention of accidents and incidents. It is not the purpose of this activity to apportion blame or liability". Luiz Ortiz and Griselda Capaldo, "Can Justice Use Technical and Personal Information Obtained Through Aircraft Accident Investigations?.," *Journal of Air Law and Commerce* 65, no. 2 (2000): 263–77; Paul Stephen Dempsey, *Public International Air Law,* (Montreal: McGill University, 2008).

accident as "an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which, a person is fatally or seriously injured as a result of being in the aircraft, or direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or direct exposure to jet blast." This also includes an accident that is caused by the damage of aircraft, which adversely affects the structural strength, performance or flight characteristics of the aircraft structure and would normally require major repair or replacement of the affected component, and the accident that is caused by the missing of aircraft or the plane or is completely inaccessible.[12]

Meanwhile, the term 'incident' is defined as an occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation."[13] Hence, incidents are not categorized as accidents that require investigation under Annex 13. Even if an investigation is needed, it is preventative in nature to avoid incident that leads to an accident.

The fundamental difference between accident and incident is that the former is the incident causes victims with serious injuries and even death, [14] while the latter is an incident that does not necessarily cause victim with fatal injuries.[15] Some experts have confirmed that it is a sequence of logically and chronologically related deviating events involving and accident that results in injury to personnel or damage to the environment or material assets. [16] Thus, serious injuries or substantial damage to aircraft are the important elements for identifying an occurrence as accident.[17] These are the legal bases for conducting investigations of accidents with the main purpose of preventing similar future accidents.

III. INVESTIGATIONS OF AIRCRAFT ACCIDENTS

Aircraft accident investigations are still the most important and decisive means for determining the most probable cause of accidents. The Chicago Convention provides a definition of an accident investigation as follows:[18]

> A process conducted for the purpose of accident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations.

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12 Chapter 1, Annex 13 the Chicago Convention.

13 *Ibid.*

14 *Ibid.* The difference between an accident and a serious incident lies only in the result.

15 *Ibid.* An incident involving circumstances indicating that an accident nearly occurred.

16 Urban Kjellen and Tore J Larsson, "Investigating Accidents and Reducing Risks — A Dynamic Approach," *Journal of Occupational Accidents* 3, no. 2 (1981): 129–40, 129, https://doi.org/https://doi.org/10.1016/0376-6349(81)90005-5.

17 Alexander T. Wells and Clarence C. Rodrigues, *Commercial Aviation Safety* (New York: McGraw-Hill, 2003), 61.

18 Chapter I Annex 13 of the Chicago Convention.

Collecting and analysing data are the essential elements of an aircraft accident investigation. The main objective is to find out the most probably causes of an accident, which is known as 'cause' or 'probable cause.'

The term 'cause' was first used in the American Air Commerce Act of 1926, which, among other things, governs the duties of the Department of Commerce to investigate, record, and publish the causes of accidents. This Act was amended in 1934 and introduced new term 'probable cause.' In 1958, the US established the Federal Aviation Administration (FAA) and the Civil Aeronautics Board (CAB). The CAB has, among other things, the duty to investigate aircraft accidents and to provide reporting of the facts found, evidence and other matters related to an accident and its probable cause(s). In 1974, the US established NTSB (National Transportation Safety Board) which is specifically tasked with investigating and determining the causes or probable causes of aircraft accidents.[19] It can be concluded that aircraft accident investigations are conducted to collect and analyse data and information related to the factors that cause an accident (probable causes).

IV. PROBABLE CAUSES

The term 'probable cause' is a key word in aircraft accident investigations. Finding probable causes provide guidance for accurate preventive action. The purpose of these investigations is not to apportion liability, but rather to emphasise effective preventive measures. Therefore, cooperation among the parties associated with an accident is very important to finding out the causes of the accident.[20] The short-term objective of finding fault will undermine the long-term goal of aircraft accident investigations, which is to prevent the similar future accidents.[21]

The term 'probable cause' is the subject of some controversy. This controversy is not only about interpretation, but also the terms used. There are numerous terms used, which represents the development of the nature of investigation, including *cause, probable cause,* and *proximate cause*. The terms 'proximate cause' and 'probable cause' for instance have different legal definitions such as, *inter alia*, direct result, natural consequence, reasonable anticipation, reasonable inquiry, reasonably probable, foreseeability, and so on.[22] On a practical level, these various definitions raise some difficulties for investigators in determining the precise cause of an accident. Determining the probable cause of an accident is a primary objective in every air-

19 "…to investigate or cause to be investigated (in such details it shall prescribe), and determine the facts, conditions, and circumstances and the cause or probable cause or causes of accidents'. Michaelides Mateou and Andreas Mateou, *Flying in the Face of Criminalization: The Safety Implications of Prosecuting Aviation Professionals for Accidents* (Surrey: Ashgate Publishing Limited, 2010), 39.

20 Wells and Rodrigues, *Commercial Aviation Safety.*

21 *Ibid.*

22 *Ibid.*, 40

craft accident investigation, but there is no agreed meaning of the term that helps scientific investigations to reach valid conclusion.[23]

The basic meaning of the term probable cause is represented in the word 'why' -why an accident occurred. Interestingly, Lederer, director of the American Civil Aviation Authority Air Safety Board came up with another similar term – 'proximate cause.' Although these two terms are considered legal terms, the former is more often used in court, while probable cause is a technical term that is commonly used in accident investigation reports.[24] Lederer, further defines 'probable cause' as follows:[25]

> We, therefore, endeavour to state how the accident happened and why. The 'why' is our conclusion expressed in terms of probable cause and contributing factors. It has been our endeavour to stick to a practical pattern which establishes the proximate causes as the probable cause and sets up the underlying or more remote causes as contributing factors.

Investigators use several terms, which contain elements of cause or probable cause. These are, among others, causal factors, determining factors, contributing factors, safety problems, active failures, and latent conditions.[26] Hopkins argues that in an accident investigation, when a causal relationship is found, it must be formulated in the following verbiage, "if we can say 'but for' the first, the second would not have occurred".[27] For the same purpose Leplat states, "to say that event X is the cause of event Y is to say that the occurrence of X is a necessary to the production of Y".[28] However, Kletz, suggests not to use the term 'cause' in an accident investigation as it may lead the investigators to accuse one party of being legally culpable.[29]

The ICAO has issued guidelines, which among other things, suggest that the accident investigation report should list the findings and the factors that caused an accident. The list should cover "the immediate and deeper systemic causes". The causes mean occurrences either single or in combination with other factors that result in casualties or other damage. Some countries have listed the various causes in chronological order, while avoiding a priority scale. Other countries have issued reports including a priority scale system to distinguish which are primary causes and which are only contributing factors. [30]

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23 *Ibid.*, 41.

24 *Ibid.*

25 Mateou and Mateou, *Flying in the Face of Criminalization: The Safety Implications of Prosecuting Aviation Professionals for Accidents*.

26 Kjellen and Larsson, "Investigating Accidents and Reducing Risks — A Dynamic Approach"; A Hopkins, *Lessons from Longford: The Esso Gas Plant Explosion* (Sydney: CCH Australia Limited, 2000); Kingsley Hendrick and Ludwig Benner, "Concepts for Investigation," in *Investigating Accidents with STEP*, ed. Kingsley Hendrick and Ludwig Benner, Occupational Safety and Health (New York: CRC Press, 1986), 1–82; James Reason, *Managing the Risks of Organizational Accidents* (Aldershot: Ashgate Publishing Limited, 1997)

27 Hopkins, *Lessons from Longford: The Esso Gas Plant Explosion,* 2.

28 J. Leplat, "Event Analysis and Responsibility in Complex Systems," in *After the Event – from Accident to Organisational Learning*, ed. Andrew Hale, Bernhard Wilpert, and Matthias Frietag (Oxford: Pergamon Press, 1998), 8.

29 Trevor Kletz, *Learning from Accidents* (Oxford: Gulf Professional Publishing, 2001), 35.

30 Annex 13 to the ICAO Standard (ICAO 2001).

Notwithstanding the ICAO guidelines, state practices vary in conducting aircraft accident investigations. There are several investigation reports providing probable causes which have indirectly led to accusations against certain parties as the cause of an accident. In this regard Fenwick and McKellar state as follows:[31]

> There seem to be a growing consensus that to include 'probable cause' in the report is outdated. Many believe that emphasizing a single cause may even be detrimental to gaining a complete understanding of what happened, and that non-pejorative language is more beneficial to the making of a complete safety report.

On a practical level, investigators view the concept of probable cause in two senses, both technical and legal. From a technical point of view, probable cause refers to the matter of possibilities and are not directed at accusing certain parties of being legally culpable. Such findings are instead a reference for improving aviation systems and technology to prevent similar future accidents. Meanwhile, from a legal perspective, the term probable cause is often used as grounds for holding parties such as pilots or air traffic controllers liable in legal proceedings. For instance, in the case of the Garuda Indonesia air crash in Yogyakarta in 2005, the Pilot (Marwoto Komar) was put on trial. The same reasoning was applied to the crash of the Olympic Airlines Falcon 900B (1999) in Thessaloniki, Greece.[32]

James Reason applies a more comprehensive approach that sees accidents as systemic failures. Reason argues that aircraft accidents are not isolated, infrequent one-off events, but rather the consequence of particular sets of circumstances in which active and latent failures, at times combined with external environmental factors, result in the failure of a system. As such, investigators should apply a total systems approach to aviation safety by conducting thorough investigations of active and latent failures as well as investigations into various stages of other system failures. Reason explains further as follows:[33]

> ...errors are seen as consequences and not as causes, and the origin of error is not so much in human nature but in systematic factors that include recurrent error traps in the workplace and the organizational process giving rise to them. A serious shortfall of examining only the human factor in an investigation is that it isolates unsafe acts from their system context.

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31 L. Fenwick and G. McKellar, "A World Without Probable Cause," Beyond Probable Cause, ALPA Annual Safety Forum, accessed December 1, 2020, http://www.airaccidentdigest.com/blog/.

32 Mateou and Mateou, *Flying in the Face of Criminalization: The Safety Implications of Prosecuting Aviation Professionals for Accidents,* 42.

33 James Reason, "Human Error: Models and Management," *British Medical Journal* 320, no. 7237 (2000): 768–70, https://doi.org/https://doi.org/10.1136/bmj.320.7237.768.

V. THE PURPOSE OF INVESTIGATION

Investigations have different purposes depending on the type of accident. According to Mateou and Mateou the purposes of accident investigations are to:[34]

> (i) identify and describe the course of the events (what, where, when), (ii) identify the direct causes and the contributing factors that led to the accident (why), (iii) identify measures to reduce the risk in order to prevent future similar accidents from occurring (learning), (iv) investigate and evaluate the basis for potential prosecution (blame), (v) evaluate the question of guilt in order to assess the liability for compensation (pay).

Hendrick and Benner divide the purpose of investigations into three main characteristics, namely:[35] "*(i) realistic, (ii) conducted in a non-causal framework resulting in an objective description of the events leading up to the accident, (iii) consistent.*" Stephen Dempsey says that aircraft accident investigations have three main objectives: "*(i) to provide corrective action, (ii) to punish a wrongdoer, (iii) to compensate injured parties.*"[36]

The preceding discussion reveals that aircraft accident investigations have three main objectives, to find out the cause(s) of the accident, to determine who is responsible, and to determine the amount of compensation. Annex 13 asserts that the main purpose of an aircraft accident investigation is to prevent similar future accidents and not to determine who is legally culpable for an accident. More specifically, Annex 13 states that the sole objective of the investigation of an accident or incident is the prevention of accidents and incidents. It is not the purpose of this activity to "apportion blame or liability." The Annex also emphasises that any judicial or administrative proceedings to apportion legally culpable should be separate from an investigation conducted under the provisions of the Annex. This separation creates two types of investigations, technical and judicial. Technical investigations emphasize finding the causes of accident and recommend preventive action, while judicial investigations aim to determine who is at fault and should be held legally responsible.[37]

As a comparison, the UK Civil Aviation Act of 1996 stipulates that the sole objective of an accident investigation "shall be the prevention of accidents and incidents. It shall not be the purpose of such an investigation to apportion blame or

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34 Mateou and Mateou, *Flying in the Face of Criminalization: The Safety Implications of Prosecuting Aviation Professionals for Accidents,* 31.

35 Hendrick and Benner, "Concepts for Investigation", 40.

36 Dempsey, "Independence of Aviation Safety Investigation Authorities: Keeping the Foxes from the Henhouse", 231"economic, punitive, and reputational effect upon individuals, airlines, manufacturers, air navigation service providers, airports, maintenance companies, and governmental institutions. Hence, many institutions and individuals are motivated to try to influence the outcome of the investigation. Article 26 of the Chicago Convention requires a State in which an aviation accident occurs (involving death or serious injury, or involving a serious technical defect in the aircraft or air navigation facilities.

37 John A. Stoop and James P. Kahan, "Flying Is the Safest Way to Travel: How Aviation Was a Pioneer in Independent Accident Investigation," *European Journal of Transport and Infrastructure Research* 5, no. 2 (2005): 115–28, 115-117.

liability".[38] Similarly, the Australia Transport Safety Investigation Act 2003 provides that the following are not objects of this Act: (a) apportioning blame for transport accidents or incidents; (b) providing the means to determine the liability of any person in respect of a transport accident or incident; (c) assisting in court proceedings between parties (except as expressly provided by the Act); and (d) allowing any adverse inference to be drawn from the fact that a person is subject to an investigation under this Act.[39]

Hence, the purpose of investigations is to determine the cause or causes, which take the form of actions, inactions, processes, events, conditions or systemic failures that led to an accident or incident by assessing the evidence and drawing conclusions in order, and where appropriate, to make recommendations so that they might not be repeated.[40] It is the enhancement of safety, and not the apportionment of blame, that is the goal of independent accident investigations.[41] It is interesting to note about the social dimension or social role of the investigations - to assure the public that the aviation investigatory system has been designed to dissect the causes of accidents, and learn from them so that they are not repeated.[42]

VI. INVESTIGATION PROCESS

The normal procedure of investigations covers the following activities:

1. establishing the scope and level of investigation;
2. collecting evidence;
3. reviewing evidence for completeness;
4. analysing evidence and drawing conclusions;
5. providing a report on the results of investigation; and
6. making recommendations based on the findings of the investigation.

Annex 13 specifically mandates that the investigation process progress in the following order, gathering, recording, and analysing all available relevant information and, if possible, determining the cause(s) and completing a final report followed by, where appropriate, the making of safety recommendations.

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38 The Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996 No. 2798, Art. 4.

39 The Australia Transport Safety Investigation Act 2003, Section 7.3.

40 Dempsey, "Independence of Aviation Safety Investigation Authorities: Keeping the Foxes from the Henhouse", 233. economic, punitive, and reputational effect upon individuals, airlines, manufacturers, air navigation service providers, airports, maintenance companies, and governmental institutions. Hence, many institutions and individuals are motivated to try to influence the outcome of the investigation. Article 26 of the Chicago Convention requires a State in which an aviation accident occurs (involving death or serious injury, or involving a serious technical defect in the aircraft or air navigation facilities

41 *Ibid.*

42 *Ibid.*, 232.

ICAO's Manual of Aircraft Accident Investigations (2000) warns against drawing premature conclusions and stresses that each investigation should make use of an elimination technique whereby, according to the circumstances, certain areas can be eliminated early on in the investigation process as being possible causes of the accident; consequently, other areas requiring extensive, in-depth investigation become apparent.[43]

The analysis of the collected data is the most difficult stage in an accident investigation, due to limited guidance from the ICAO. The ICAO report format deals mainly with the structure of the report and does not provide guidance on the analysis of the data. For this reason, some reports on aircraft accident investigations often spark controversy and debate and are not universally accepted. The ICAO encourages providing very clear guidelines for data analysis to avoid creating inaccurate reports.[44]

As the purpose of accident investigations is to prevent similar future accidents, final reports include safety recommendations. Such recommendations must be supported by the evidence obtained from the investigation and other related sources. However, in practice, there is no framework in place to ensure that the safety lessons are learnt or that corrective actions are implemented. [45]

VII. SCOPE OF INVESTIGATIONS

Prior to commencing any form of investigation, it is important to first determine the scope and level of the investigation. This generally depends on various factors such as, *inter alia*, the availability of resources to the investigators, allocation of time, and workload. On a practical level, investigators often have difficulty determining the scope of an investigation. These threshold determinations include the duration, the rules and procedures, and the criteria for concluding an investigation.

It is therefore very important for investigators to have a theoretical basis from which to work. A key factor in an investigation is the expected safety. Many national air safety investigation agencies generally apply policies that the scope and level of an investigation depends on level of the safety benefits to be obtained.[46]

One of the important questions related to the scope of the investigation is whether all aviation accidents or incidents should be investigated. This depends on the level and quality of an investigation that is justified and is appropriate. In general, an investigation consists of two forms, accident, and incident investigations, which are based on two considerations. The first is that because of limited resources, it is more focused on in-depth investigations that can contribute the most to aviation

43 Mateou and Mateou, *Flying in the Face of Criminalization: The Safety Implications of Prosecuting Aviation Professionals for Accidents,* 47.
44 *Ibid.*
45 *Ibid.*
46 *Ibid.*, 49.

safety. Second is the consideration of whether an investigation contributes to the improvement of aviation safety. All of these are based on preliminary parameters before an investigation is carried out. For example, it must be initially determined whether the occurrence is an accident or incident, to what extent the accident affects the public interest, the type of aircraft, and so on. [47]

VIII. THE INDEPENDENCE OF AVIATION SAFETY INVESTIGATION AGENCIES

Aircraft accident investigations are generally conducted by a special agency established for this purpose such as the National Transportation Safety Bureau (NTSB) in the US and the National Transportation Safety Committee (*Komisi Nasional Keselamatan Transportasi*/KNKT) in Indonesia. These institutions produce objective recommendations, not intended for the benefit of one party but for the purpose of improving aviation safety. Therefore, independence, autonomy, and technical expertise are important. Also, the investigator(s) involved must be perceived as objective, impartial, and free from political influence or the appearance of impropriety or conflicts of interest.[48]

The credibility of the investigative body depends among other things on competence, integrity, neutrality, and independence. This is essential if the recommendations are intended for corrective action based on objective findings in an investigation. The credibility and integrity of an investigative body is determined by the independence, autonomy, and technical capabilities of its investigators so that they can act objectively, impartially, free from political interests, and free from any conflicts of interest.[49]

Annex 13 explicitly provides that "...the accident investigation authority shall have independence in the conduct of the investigation and have unrestricted authority over its conduct." However, this independence does not necessarily mean that the investigative authority is not a government agency. Accordingly, independence here is more of an attitude and not institutional. This is to accommodate certain countries which have many limitations on their investigative authority and completely separate from the government. In this regard, the ICAO states as follows:[50]

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47 *Ibid.*

48 George Tompkins and Andrew Harakas, "ICAO and Aviation Accident Investigation," *Annals of Air & Space Law* 19, no. 2 (1994): 375–98, 375.

49 *Ibid.*

50 Dempsey, "Independence of Aviation Safety Investigation Authorities: Keeping the Foxes from the Henhouse"economic, punitive, and reputational effect upon individuals, airlines, manufacturers, air navigation service providers, airports, maintenance companies, and governmental institutions. Hence, many institutions and individuals are motivated to try to influence the outcome of the investigation. Article 26 of the Chicago Convention requires a State in which an aviation accident occurs (involving death or serious injury, or involving a serious technical defect in the aircraft or air navigation facilities, 234.

> A State's primary aviation legislation should contain provisions to enable the Government and its administration to conduct or participate in aircraft incident and accident investigations which may be vested in an independent or separate body... The State should establish an investigation authority to be responsible for the conduct of accident and incident investigations.

The ICAO's Manual of Aircraft Accident and Incident Investigations also emphasises that an accident investigation authority must be strictly objective and totally impartial and must also be perceived so. The authority should steer clear of political interests and must not be subject to political pressure or interference. In the investigation of the crash of Adam Air in 2007, the report of KNKT investigation received a negative reaction from the public because there were allegations of political interference from the founder of Adam Air, Agung Laksono, who was then Speaker of the Indonesian Parliament (DPR). To ensure the independence of investigative bodies, the European Union stipulates that these bodies should be functionally, operationally, and financially separate from the civil aviation administration responsible for airworthiness, certification, flight operation, maintenance, licensing, air traffic control or airport operations, or any other institution that might conflict with the tasks ascribed to the accident investigator.[51]

To maintain the independence of investigative bodies to allow consistency with their main function, finding a cause or probable cause, Annex 13 recommends that any court or administrative action designed to apportion blame or impose liability should be autonomous from an accident or incident investigation. While take care to maintain independence and autonomy, investigative bodies must establish a scheme of coordination with judicial authorities. In general, most of the evidence obtained remains confidential, unless judicial authorities determine that the disclosure outweighs the adverse domestic and international impact that such action may have on that or any future investigations. [52]

IX. TECHNICAL AND JUDICIAL INVESTIGATIONS

Aircraft accident investigations come in two forms, technical and judicial. [53] The main purpose of technical investigations is to prevent similar future accidents and not to apportion liability. The cornerstone of such technical investigations is a 'no blame' approach. Technical investigations are also not intended for evidence gathering purposes. Technical investigations are non-punitive in nature, and the accident scenario and sequence of events leading up to an accident are derived from the facts collected.[54] The core objective is to determine the causes of aviation accidents, so

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51 The Council Directive 94/56, 1994, Art. 56.

52 The Chicago Convention, Annex 13.

53 Mateou and Mateou, *Flying in the Face of Criminalization: The Safety Implications of Prosecuting Aviation Professionals for Accidents,* 2.

54 The Chicago Convention, Chapter 3.1 of Annex 13.

that appropriate action can be taken to prevent similar events from occurring in the future. [55]

Judicial investigations, aimed at finding out the reasons for the death or injury of so many people, focuses on identifying those responsible and attributing blame and that can be used as reference for the payment of compensation. These investigations are punitive in nature, generally focused on the facts and evidence collected during the investigation. Judicial investigations are also carried out to respond to the interests of related parties in an accident, for example determining compensation for the victims, as well as the public interest by identifying criminal perpetrators.

This approach creates a conflict that stems from the fundamental differences in the aims and objectives of the two types of investigation. The judicial investigation, aimed at finding out the reasons for the death or injury of so many people, focuses on identifying those responsible and attributing blame, whereas the technical investigation aims at determining the reasons that led to the accident and at recommending corrective safety measures to eliminate the possibility of similar accidents and serious incidents from recurring, without apportioning blame or liability. There is thus a great divergence in the methodology and approach of these two separate, but parallel investigations conducted in the aftermath of an aviation accident.[56]

In practice, the relationship and interaction between the two types of investigations can be observed both in countries with common law and countries with civil law system. In Common Law countries such as the United States, United Kingdom, and Australia, technical investigations take priority, unless there is a strong suspicion of criminal activity such as terrorism. Meanwhile, countries with Civil Law (Napoleonic Code) such as France, Italy, and the Netherlands give priority to judicial authorities to conduct judicial investigations.[57]

The tension between the two types of investigations is unavoidable. This can be seen for example in the case of the crash of Transworld Airlines B747 Flight 800 from New York to Paris on 17 July 1996, over the Atlantic Ocean. The NTSB report concluded that the probable cause was an explosion in the centre wing fuel tank resulting from ignition of the flammable fuel/air mixture in the tank, which was most likely ignited by a short circuit that allowed excessive voltage to enter the fuel tank through electrical wiring associated with the fuel quantity indication system. It was

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55 Dempsey, "Independence of Aviation Safety Investigation Authorities: Keeping the Foxes from the Henhouse"economic, punitive, and reputational effect upon individuals, airlines, manufacturers, air navigation service providers, airports, maintenance companies, and governmental institutions. Hence, many institutions and individuals are motivated to try to influence the outcome of the investigation. Article 26 of the Chicago Convention requires a State in which an aviation accident occurs (involving death or serious injury, or involving a serious technical defect in the aircraft or air navigation facilities, 227.

56 Mateou and Mateou, *Flying in the Face of Criminalization: The Safety Implications of Prosecuting Aviation Professionals for Accidents,* 100.

57 *Ibid.*

also suspected that the accident was caused by a terrorist act, or a test missile fired from a US Warship.

The FBI (Federal Bureau Investigation) started a concurrent criminal investigation by interviewing over 40,000 people including eyewitnesses. The Senate judiciary sub-committee criticised the FBI's investigation as unprofessional and overpowering. The FBI applied their own rules regarding the collection of evidence and the release of information, which conflicted and impeded the technical investigation carried out by the NTSB. The specific characteristic of the FBI investigation, which focused on intelligence investigation often resulted in the NTSB investigation being diverted and focusing on various theories, ultimately delaying the investigation and draining the NTSB's resources.[58] This was a disaster that hindered the investigation and put the public at risk.[59]

An example of excellent cooperation between technical and judicial investigations was the investigation of the Pan-Am crash that occurred on 21 December 1988 above the small Scottish town of Lockerbie. There, the technical investigation of the crash preceded the judicial or criminal investigation. In its report, the UK Air Accident Investigation Board (AAIB) concluded that "the in-flight disintegration of the aircraft was caused by the detonation of an improvised explosive device located in a baggage container positioned on the left side of the forward cargo hold at aircraft station 700" (AAIB 1998). It became evident that the aircraft was destroyed because of bomb exploding and perpetrated by a suspected terrorist organization. Following this technical determination, the investigation turned into a judicial investigation.[60]

Technical investigations are a quintessential element of aircraft accidents in most common law countries. Judicial investigations are a further step only if a technical investigation finds evidence of criminal activity. In other words, judicial investigations are not independent inquiries, because they depend on initial evidence from technical investigations.[61]

In the UK, for example, the Memorandum of Understanding between the Crown Prosecution Service (CPS) and the Air Accident Investigation Branch (AAIB) states that the sole objective of an aircraft accident investigation is to prevent future accidents and not to apportion blame or liability.[62] The AAIB has the powers to have:

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58 Lindsay Fenwick and Michael Huhn, "Criminal Liability and Aircraft Accident Investigation," Air Line Pilot, 2003, 17, http://www3.alpa.org/portals/alpa/magazine/2003/May2003_CriminalLiability.htm.

59 National Transportation Safety Board, "Aircraft Accident Report: In-Flight Breakup over the Atlantic Ocean Trans World Airlines Flight 800. NTSB Number AAR-00/03; NTIS Number PB2000-910403." (Washington DC, 2000), https://www.ntsb.gov/investigations/AccidentReports/Reports/AAR0003.pdf.

60 Sofia Michaelides, "The Lockerbie Trial: The End of a Chapter – Not the End of a Chapter," paper presented at the Cine Studio, University of Nicosia, 2001.

61 Mateou and Mateou, *Flying in the Face of Criminalization: The Safety Implications of Prosecuting Aviation Professionals for Accidents,* 102.

62 Air Accidents Investigation Branch, "Memorandum of understanding between the Crown Prosecution Service and the Air Accidents, Marine Accidents and Rail Accidents Investigation Branch".

free access to the accident site; the aircraft, its contents or its wreckage; witnesses; the content of flight recorders; the result of examination of bodies; the results of examinations or tests made on sample from persons involved in the aircraft's operation and relevant information or records. They also have the power to control the removal of debris or components; examine all persons as they think fit; take statements; enter any place, building or aircraft; remove and test components as necessary and take measures for the preservation of evidence.

Evidence and information gathered remain confidential and are no disclosed to other parties including the police and CPS. However, if the CPS finds any indication of a criminal act and decides to prosecute, the AAIB is notified and the AAIB must make available to the CPS a pre-publication copy of the finalized report at the earliest opportunity. This pre-publication copies of a finalized report given to the CPS is to be treated as confidential.[63] When it is suspected that an accident is the result of a criminal or terrorist act, judicial authorities take over the investigation as was the case in the Pan Am 747 mid-air explosion over Lockerbie.[64]

In the US, the National Transportation Safety Board (NTSB) is the institution responsible for investigating transportation accidents, including aircraft accidents. However, if evidence leads to suspicion of criminal activity, judicial authorities will conduct a parallel investigation with the NTSB. This can be seen in the case of the downing of the Alaska Airlines MD-83 Flight 261.[65]

On 31 January 2000, MD-83 Alaska Airlines Flight 261, operating a scheduled international passenger flight from Puerto Vallarta, Mexico, to Seattle with a stop at San Francisco, California, crashed into the Pacific Ocean. Both the pilots, three cabin crew members and all 83 passengers on board were killed, and the plane was destroyed. Following the accident, the FBI initiated its own, separate, parallel criminal investigation into the accident amidst allegations of maintenance malpractices by the airline and an already ongoing criminal investigation by the FBI regarding falsifying maintenance records of the crashed aircraft. The criminal investigation was subsequently put on hold, pending the outcome of the NTSB report. In December 2002, the NTSB concluded that the most probable cause of the accident to be the insufficient lubrication of the jackscrew which led to excessive wear on the nut threads, resulting in the stabilizer breaking off during flight.[66]

In civil law countries (Napoleonic Code), judicial investigations play a more prominent role than technical investigations. In Italy, France, the Netherlands, and

63 *Ibid.*

64 Mateou and Mateou, *Flying in the Face of Criminalization: The Safety Implications of Prosecuting Aviation Professionals for Accidents,* 103.

65 *Ibid.,* 104-105

66 *Ibid.*

Russia, for instance, judicial authorities are allowed to conduct judicial investigations and at the same time as technical investigations, taking a leading role in aircraft accident investigations, especially in analysing data in the CVR (Cockpit Voice Recorder) and FDR (Flight Data Recorder). This system often raises tensions between judicial authorities and technical investigative bodies. For example, this was the case of the BAC 1-11 that crashed in Italy, where a BAC 1-11 with British registration crashed near Milan, Italy, on January 4, 1969. The Italian judicial authorities did not allow the British technical investigation agency to bring the FDR it found for processing and reading out in the UK. The problem arose when the Italian judicial authorities were unable to read the recorded data. The UK's investigating agency argued that information from the FDR was crucial to prevent a similar future accident. More importantly, the UK's investigating agency was able to convince Italian judicial authorities that technical investigations were only tasked with finding facts, not determining legal responsibility. Eventually, the Italian judicial authorities agreed to allow the FDR to be taken to London for the analysis, because technical investigations are the threshold point for judicial investigations.[67]

In the Netherlands, on 25 February 2009, a Boeing 737-800 Turkish Airlines Flight crashed short of landing at Amsterdam's Schiphol Airport, breaking into three pieces on impact and killing nine of the 128 passengers and three crew members, and injuring more than 50 others. The official accident investigation was conducted by the Dutch Safety Board (*Onderzoekstraat voor Veiligheid*) and a separate judicial investigation was also launched. The FDR and CVR were recovered by technical investigators and transported to Paris for analysis. The Dutch Public Prosecutor asked the DSB to hand over the FDR and CVR, but they refused to do so. This situation eventually triggered tensions between the two investigative institutions. Finally, Boeing and Airbus announced that the accident occurred due to a malfunction of the "radio altimeter".[68]

Judicial investigations have been a common practice in Russia the crash of a Challenger 850 accident on 13 February 2007. The aircraft departed from Moscow-Vnukovo airport *en route* to Berlin with three crew members and no passengers on board and crashed during the initial take-off, resulting in all three crew being injured. The prosecutor's general office commenced a criminal investigation following the accident. [69]

X. AIRCRAFT ACCIDENT INVESTIGATIONS IN INDONESIA

Unlike the practices of most civil law countries, Indonesia does not conduct

[67] William H. Tench, *Safety Is No Accident* (London: Collins and Professionals and Technical Books, 1985).

[68] Mateou and Mateou, *Flying in the Face of Criminalization: The Safety Implications of Prosecuting Aviation Professionals for Accidents,* 115-116.

[69] *Ibid*., 116.

judicial investigations of aviation accidents. Indonesian Aviation Law of 2009 states as follows:[70]

(1) The government conducts investigations and subsequent inquiry regarding **the causes** of accident and serious incident of a civil aircraft that occurred in the territory of the Republic of Indonesia (emphasis added).

(2) The investigation and subsequent inquiry as referred to in paragraph (1) shall be carried out by a national committee which is formed and is responsible to the President.

Indonesia neither gives a prominent role to judicial investigations nor conducts parallel investigations between technical and judicial investigations. Judicial investigations commence only if a technical investigation finds evidence of criminal activity. Article 359 paragraph (1) Law No. 1/2009 states "[t]he reports of the investigation cannot be used as evidence in the judicial process". Investigations for the purpose of judicial process must be carried out independently because the core objective of technical investigations is to determine probable causes, not gather legal evidence.

This provision seems to have been inspired by the crash of the Garuda Boeing 737-400 at Yogyakarta Airport on 7 March 2007. The KNKT found that the accident in which the aircraft overran the runway on a landing, caught fire, killing 20 passengers and a crew member was caused partially by the captain attempting a landing at twice the proper speed, his failure to react to the 15 GPWS warning and the first officer's call to initiate a go-round. A parallel investigation was carried out by the police and at the end of their investigation a report was handed over to the prosecutors. Pilot Marwoto Komar was accused of "negligence" which resulted in the deaths of 20 passengers. This judicial process sparked controversy as this was considered criminalizing the pilot. The findings of a technical investigation report are not admissible in a criminal prosecution.

Marwoto Komar was the first Indonesian to stand trial for actions in an aviation accident. The judge stated that criminal prosecution and not civil proceedings was the correct forum in such circumstances by saying "National law takes precedence over international convention, and the civil authority can only impose civil sanctions." There were protests in Jakarta demanding his release and the Federation of Indonesian Pilots staged a rally at the House of Representatives. Two survivors of the accident also went to the House of Representatives to challenge those opposed to the prosecution of the pilot. On 6 April 2009, the Sleman District Court found the captain guilty of negligence and sentenced him to two years in jail. The captain immediately appealed and was released on bail, pending the appeal. On 29 September 2009, the Yogyakarta High Court panel of five judges heard the appeal and held

[70] Indonesia, Law No. 1 of 2009 on Aviation (hereinafter Law No. 1/2009), Article 357.

that the captain's negligence was not legally proven and overturned the conviction. Again, there was public outcry, particularly from the members of the Australian victims' families who felt that there were no legal ramifications resulting from the crash.[71]

This accident became an important factor in the legislature's establishment of aviation laws that clearly separate technical and judicial investigations. More specifically, Article 364 Law No. 1/2009 states that:

> To carry out further investigations, enforcement professional ethics, mediation and interpreting regulations, the National Transportation Safety Committee establishes the Aviation Professional Council.

This provision confirms that the negligence or malpractice of pilot in operating aircraft is not generally considered a crime.

After the crash in Yogyakarta in 2007, there were at least five catastrophic airplane crashes including the crash of a Merpati Airliner in Papua in 2008, which killed 25 passengers and cabin crew. This was followed by the crash of the Sukhoi Superjet 100 in Bogor in 2012 which killed 100 passengers, the crash of Air Asia in the Karimata Strait in 2014 which killed 162 passengers, the crash of the Lion Air in the Java Sea in 2018 which killed 189 passengers, and most recently the crash of Sriwijaya Air in 2021 in the Seribu islands that killed 62 passengers and cabin crew.[72]

Unlike the investigation of the crash of Garuda Indonesia in Yogyakarta in 2007, there has never been a parallel technical and judicial investigation for the catastrophic aircraft accidents as mentioned above. This seems to demonstrate that aircraft accident investigations in Indonesia prioritize technical investigation over judicial investigations, which are carried out only if there is strong evidence of criminal activity. Further investigations are carried out by the Aviation Professional Council which has the following duties:

1. upholding professional ethics and personnel competence in the field of aviation;
2. carrying out mediation between flight service providers, personnel, and flight service users; and
3. interpreting the application of regulations in the field of aviation.

Unfortunately, the Aviation Professional Council has not yet been established for several reasons although the establishment of the Council is mandated by the Law No. 1/2009.[73]

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[71] Mateou and Mateou, *Flying in the Face of Criminalization: The Safety Implications of Prosecuting Aviation Professionals for Accidents*, 95-96.

[72] https://kompaspedia.kompas.id/, accessed on 16 September 2021.

[73] Law No. 1/2009, Article 369.

XI. CONCLUSION

The main objective of an aircraft accident investigation is to find out the causes or probable causes of the accident. These findings are used as recommendations for improving the aviation safety to prevent the similar future accidents. The accident investigation is of a technical in nature. Judicial investigation is a further step only if a technical investigation finds evidence criminal activity. This is not an independent inquiry, because it depends on the initial evidence from a technical investigation.

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