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## **ACCIDENTS ON BOARD AN AIRCRAFT: GOALS AND OBJECTIVES OF THE INVESTIGATION**

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**Purpose:** to determine the features of ensuring the investigation of an accident on board an aircraft. **Methods:** analysis and synthesis of options for the occurrence of aircraft accidents on board an aircraft, the interpretation method has identified a system to counter the development of negative scenarios. **Results:** the legal aspects of the concept of an accident are identified, the statistics of aircraft accidents are analyzed. **Discussion:** a proposal to include this issue on the agenda of international organizations.

**Keywords:** aviation; incident; accident; disaster.

**The problem statement and its relevance.** The implementation of economic reform, the emergence of various forms of ownership led to significant changes in the sphere of production, services and public administration. The transition to market relations, fundamentally new methods of state regulation have led to the strengthening of the role of law and the creation of a new legal basis to ensure aviation safety.

The main fundamental change in the field of state regulation of civil aviation is a gradual transition from the principle of expediency to the principle of compliance with applicable law.

Considering that new concepts, principles, new legal institutions have appeared in the current legislation, there was a need for a radical change in approaches to the legal training of aviation personnel, including specialists in the investigation of aircraft accidents and incidents. First of all, he training should be focused on the particularities of applying the applicable law in the investigation of aircraft accidents, using their full rights and ensuring legal protection of transport system operators systems involved in aircraft accidents. Today, an accident

investigation specialist must be able to analyze and apply the requirements of regulatory acts when evaluating the work of the crew and other aviation specialists. Unfortunately, the constant change of the authorized bodies in the field of civil aviation of Ukraine has led to the creation of a large number of acts, which in some cases duplicate each other, sometimes conflict with each other, and sometimes, on the contrary, create a legal vacuum. The free use of these documents, often not reflecting the essence of the content, leads to the fact that in different regulatory acts the same relations are regulated differently. All documents defining the rights, duties and responsibilities of personnel were previously focused on the unconditional implementation of existing regulations. This is really fair only with full perfection (including legal) of the existing rules and instructions in those fields where we can foresee all possible event scenarios.

However, the operation of air transport, especially flying, provides for the possibility of the occurrence of many different situations that simply cannot be foreseen and described in the document.

**The purpose** of the article is to determine the main legal parameters of the investigation of aircraft accidents.

**Analysis of research and publications.** In the doctrine of air law, the features of ensuring the investigation of aircraft incidents are considered in the works of A. Algin, V. Abchuk, O. Bandurka, Y. Bityak, B. Biryukov, U. Beck, I. Wallerstein, M. Weber, E. Hobsbaum, M. Greenberg, R. David, K. Joffre-Spinoza, V. Oisenhint, O. Kopan, V. Stolbovy, H. Raifa, O. Tikhomirov, M. Kovalev, V. Kopychikov, V. Kolpakov, V. Kotyuk, V. Lipkan, R.D. Lewis, V. Mamchun, T. Rictor, E. Fromm, V. Chaban, V. Shamray and others.

**Statement of the main topic.** An aircraft accident is an event related to the flight operation of an aircraft that has resulted in the death (fatal injury) of any person on board the aircraft.

An accident or incident involving a civil aircraft of Ukraine or a civil aircraft of a foreign state on the territory of Ukraine is subject to mandatory investigation.

An accident or incident involving a civil, state or experimental aircraft of Ukraine or with an aircraft of a foreign state on the territory of Ukraine is subject to mandatory investigation.

The purposes of an aircraft accident or incident investigation are to establish the causes of the accident or incident and to take measures to prevent them in the future. Establishment of one's guilt and responsibility is not the purpose of the investigation of an accident or incident.

Investigations, classification and accounting of aircraft accidents or incidents are carried out by specially authorized bodies entrusted with these powers in civil, state or experimental aviation, respectively. Investigations, classification and accounting of accidents or incidents are carried out in accordance with Article 119 of the Air Code of Ukraine and ICAO rules.

The process of an accident or incident investigation includes the collection and analysis of information, conducting the necessary research, establishing the causes of the accident or incident, preparing a report and conclusion, developing recommendations, analyzing the results of the investigation [1].

The investigation of an accident or incident is carried out according to the multifactorial principle, which provides for the identification of deviations in the functioning of the aviation transport system and an assessment of the effect of these deviations on the outcome of an aircraft flight.

Investigation of aviation events not related to aircraft accidents and incidents is carried out in the manner determined by the State Aviation Service of Ukraine.

The collision of two or more aircraft is investigated as a single event, and is classified and taken into account for each aircraft in accordance with the consequences. The general final report and information reports for each aircraft are drawn up after the results of the investigation.

Aircraft accident is an event associated with the use of an aircraft that takes place from the moment when a person came on board with the intention of making a flight until the moment when all persons on board for the purpose of flying left the aircraft, as a result of such causes:

a) a person receives fatal injuries as a result of being in this aircraft, except in cases where bodily injuries were caused due to natural causes: caused by oneself or by others, or when injuries were inflicted on stowaways hiding outside areas where passengers and crew members have an open access;

For the purposes of uniformity of statistics, bodily injury resulting in death within 30 days of the occurrence is classified as fatal injury.

b) the aircraft gets damaged or its structure is destroyed, as a result of which: the structural strength is violated, technical or flight characteristics of the aircraft are deteriorating;

major repairs are required, replacement of a damaged element, except for: cases of engine damage when only the engine itself, its bonnets or auxiliary units are damaged, or only propellers, non-bearing elements of the airframe, fairings; the elements of the main and tail rotors, bushes of the main or tail rotors, drivetrain, damage of the fan unit or reduction gear are damaged, and these cases did not lead to damage or destruction of the fuselage load-bearing elements: damage of the fuselage casing without damage of the load-bearing elements;

c) the aircraft disappears without being in such a place, to conduct or where access to it is absolutely impossible.

The aircraft is reported as missing when its official searches were discontinued and the whereabouts of the aircraft or its debris were not established. The decision to terminate the search for a civil aircraft in distress is made by the Ministry of Internal Affairs of Ukraine.

*Aircraft accident with human casualties* - an accident that resulted in the death or missing of any of the passengers or crew members.

Disasters also include the deaths of any of the persons on board during their emergency evacuation from an aircraft.

*Aircraft accident without human casualties* - an accident that did not result in human casualties or the disappearance of any of the passengers or crew members.

*Aircraft incident* - an event associated with the use of an aircraft that takes place from the moment when a person came on board with the intention to make a flight, until the moment when all persons on board for the purpose of flight left the aircraft, and due to malfunction of the aircraft, crew, control services and flight support, environmental impact, which can have an impact on aviation safety, but which did not result in an accident.

Aviation events are divided into:

- aircraft accidents;
- aircraft incidents (serious aircraft incidents);
- industrial accidents.

Aircraft accidents, depending on their consequences, are divided into:

- aircraft accidents with human casualties;
- accident without human casualties. Industrial

accidents are divided into:

- damage of the aircraft;
- emergency situations.

According to Chapter 8 of Annex 13 to the ICAO Convention, the causes of accidents or serious incidents must be established in order to prevent similar incidents in the future. Identification of causative factors can be done by conducting a properly organized investigation. That is why annex 13 indicates that the purpose of an accident or incident investigation is to «prevent future accidents and incidents» [2].

Annex 13 contains international requirements for the investigation of aircraft accidents and incidents. They are formulated in such a way as to be understandable to all participants of such investigations. Thus, it is as a reference document for those persons who may be involved in the investigation, sometimes even without prior notice, to resolve many issues related to the investigation of an accident or a serious incident. For example, the annex indicates which states can take part in the investigation, namely: state of the place of event, state of registration, state of the operator, state of the developer and state of manufacture. It also defines the rights and responsibilities of such states.

The most common cause of air crashes is the human factor. According to statistics, there are the following reasons:

Pilot errors - 50%:

pilot errors (unprovoked) - 29%,

pilot errors caused by adverse weather conditions - 16%,

pilot errors caused by equipment failures - 5%.

Failures of aircraft - 22%.

Weather conditions - 12%.

Terrorism - 9%.

Ground personnel errors (air traffic controllers, aircraft technicians, etc.) - 7%.

Other causes - 1%.

The most dangerous flight part is take-off and landing due to the low altitude of the flight and, as a result, the lack of time to assess the problem and solve it. Accidents during the flight can be the following:

taxi - 3.3%

run-up - 17.6%

takeoff - 11.1%

climb - 6.5%

cruise flight - 5.2%

descent - 3.3%

expectation and approach - 11.8%

landing - 16.3%

landing roll - 24.8% [3].

The ninth edition of Annex 13 consists of eight chapters. The first three chapters contain definitions, information on applicability and general provisions. Chapter 3 provides for the procedure for the storage of physical evidences and the responsibility of the state of the place of event for the stor-

age of physical evidences, the protection of the aircraft. In addition, it defines how such a state should consider requests from other states to participate in the investigation.

All states that may be involved in the investigation must be notified of the incident in a timely manner. Information on the procedure for such notification is in Chapter 4. The same chapter describes the obligations to conduct an investigation, depending on the place of the incident, for example, in the territory of a Contracting state of ICAO, the territory of a state that is not a Contracting state or outside the territory of any ICAO state. Chapter 5 provides for an investigation process after formal notice of the investigation to the relevant authorities.

Responsibility for the investigation lies with the state in which the accident or incident occurred. If the incident occurred outside the territory of the states, then the responsibility for the investigation lies with the state of registration.

The registration, operator, and developer states that are involved in the investigation are given the right to appoint an accredited representative in the investigation. In addition, advisors may be appointed to assist accredited representatives. The state conducting the investigation may engage the most qualified technical personnel of any organization to assist in the investigation.

The investigation process includes the collection, recording and analysis of all incident-related information; establishing the reasons; making recommendations to ensure aviation safety; preparation of the final report.

Chapter 5 includes provisions for the investigator officer, flight recorders, autopsy, coordination with the judiciary, informing aviation security authorities, disclosing records and resuming the investigation. States whose citizens died in an accident also have the right to appoint an expert to participate in the investigation.

Automated databases facilitate the storage and analysis of information on aircraft accidents and incidents. The sharing of such information on aviation safety is believed to be critical in the prevention of aircraft accidents. ICAO maintains an automated database known as the «Accident/Incident Data Reporting» (ADREP), which facilitates the

exchange of aviation safety information between Contracting states. Chapter 13 of Annex 13 provides for reporting requirements under the ADREP system through the use of preliminary and informational reports on aircraft accident/incident.

Chapter 8 of Annex 13 provides for accident prevention measures. The provisions of this chapter deal with the systems of mandatory and voluntary reporting of incident data, as well as the need to create the conditions that are not oriented to the punishment in the case of voluntary reporting of aviation safety hazards. This chapter discusses database systems and tools for analyzing the aviation safety data contained in these databases, as well as how to use such data to determine the necessary preventive measures. It also recommends the states to encourage the establishment of information-sharing networks on aviation safety to facilitate the free exchange of information on actual and potential deficiencies in providing aviation safety. The processes described in this article are part of an aviation safety management system whose goal is to reduce the number of accidents and serious incidents worldwide.

**Conclusions.** The costs of accident prevention are not easy to compare with the benefits resulting from such measures, since it is not possible to know which accidents did not occur due to measures to prevent them. However, such measures often lead to increased efficiency of the enterprise, as they are aimed at eliminating errors and deficiencies at all levels and in various fields. The need to create and implement accident prevention programs that complement traditional safety regulatory measures can be justified by the following considerations: 1) aircraft accidents continue to happen, despite the existence and implementation of numerous rules and regulations for the safe operation of civil aviation; 2) the persons involved in the incident, as a rule, are reluctant to report information about mistakes and violations to the authorities conducting the investigation.

Such information may be crucial for a final understanding of what happened and, therefore, for the development of preventive measures; 3) organizations involved in investigations sometimes hide shortcomings in the work of the public regulatory bodies of civil aviation themselves,

which, in turn, may give rise to: conflicts of interest; trust crisis, etc.

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## АВІАЦІЙНІ ПОДІЇ НА БОРТУ ПОВІТРЯНОГО СУДНА: ЦІЛІ ТА ЗАВДАННЯ РОЗСЛІДУВАННЯ

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**Мета:** визначення особливостей забезпечення проведення розслідування авіаційної події на борту повітряного судна. **Методи:** аналіз і синтез варіантів, що впливають на авіаційні події, які трапляються на борту повітряних суден, методом інтерпретації визначено систему протидії розвитку негативних сценаріїв. **Результати:** визначені правові аспекти поняття авіаційної події, проаналізована статистика авіаційних подій. **Обговорення:** пропозиція включення цього питання в повістку дня міжнародних організацій.

Авіаційна подія – подія, пов'язана з експлуатацією повітряного судна, яка відбувається: у разі пілотованого повітряного судна у проміжок часу між посадкою будь-якої особи на борт повітряного судна з метою здійснити політ та часом, коли всі особи, які перебували на борту, залишили повітряне судно; у разі безпілотного повітряного судна з часу, коли повітряне судно готове рушити з місця для виконання польоту, до часу його зупинки після завершення польоту та вимкнення головної силової установки.

Зіткнення (небезпечний підхід) двох або більше літальних апаратів досліджується як одна подія, і класифікується та враховується для кожного повітряного судна відповідно до наслідків. На основі результатів розслідування складається загальний підсумковий звіт та інформаційні звіти для кожного повітряного судна.

Аварія – це подія, пов'язана з використанням повітряного судна, яка відбувається з моменту, коли хтось прийшов на борт із наміром здійснити політ, до моменту, коли всі особи на борту з метою виконання польоту залишили літак:

а) людина отримує смертельну травму внаслідок перебування в ПС, за винятком випадків, коли тілесні ушкодження були спричинені внаслідок природних причин, спричинених самим чи іншими особами, або коли тілесні ушкодження були завдані безвідмовно, ховаючись за межами районів, де пасажир та екіпаж члени зазвичай відкриті; тілесні ушкодження, що спричинили смерть протягом 30 днів з моменту виникнення авіаційної події, класифікуються як смертельні ушкодження;

б) повітряне судно пошкоджено або його конструкція зруйнована;

в) повітряне судно зникає, не перебуваючи в такому місці, вести його або там, де доступ до нього абсолютно неможливий.

Людська аварія (аварія) – нещасний випадок, внаслідок якого стається загибель або зникнення безвісти будь-якого пасажирів чи екіпажу. До катастроф належать також загибель будь-якої людини, що знаходилась на борту під час екстреної евакуації з літака.

**Ключові слова:** авіація; інцидент; події; катастрофа; розслідування; атмосфера; право; безпека.