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## MODERNIZATION OF THE AIRPORT INFRASTRUCTURE OF UKRAINE IN THE PROCESS OF ADAPTATION OF CIVIL AVIATION LEGISLATION TO INTERNATIONAL AND EUROPEAN STANDARDS

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**Abstract.** *The article analyzes international and European standards of civil aviation and their influence on the modernization of the airport infrastructure of Ukraine, which becomes one of the factors of increasing the country's capacity for economic growth. The study uses comparative and systematic methods to clarify the essence and effectiveness of the priority directions for the restoration of the airport infrastructure of Ukraine, taking into account the huge losses from the full-scale invasion of the Russian Federation on the territory of sovereign Ukraine. Modernization of airport infrastructure becomes one of the factors of increasing economic growth of Ukraine, increase of cargo and transit transportations will effectively speed up economic growth within Ukraine. Proper implementation of ISAO standards and recommended practices will increase the safety and efficiency of the airport industry, will contribute to the support of safe, secure and sustainable development of aviation transport.*

**Keywords:** *airports, aviation safety, infrastructure, integration into the world economy.*

### Introduction.

The UN program "Sustainable Development Goals for the period until 2030" was adopted with the aim of establishing security and prosperity on the planet, which requires combining the capabilities of the entire international community [1]. In order to ensure the development of transport infrastructure in accordance with international and European standards, the Action Plan for the implementation of the National Transport Strategy of Ukraine for the period up to 2030 was approved [2]. But the aggressive war of the Russian Federation on the territory of Ukraine destroyed the plans for the development of the transport infrastructure of the airport industry, caused serious damage to the civil aviation industry in Ukraine.

The state of the material and technical base of airports, in particular, airfield buildings and structures, runways, passenger terminal complexes, existing equipment, etc., was damaged. With the start of hostilities, the airspace over Ukraine was closed and air traffic stopped. Russian troops began active missile attacks on all key airfields in Ukraine, trying to deprive them of the ability to provide air defense. As a result, 19 airfields out of 35 were damaged, including 12 civil and 7 dual-purpose airfields (excluding military airfields) [3]. Some of the airfields were repeatedly shelled. The Report states that detailed information on the state of damage for the repair of airfields at most airports can be established only after detailed technical surveys, which are



possible only after the end of active hostilities in the area where the airports are located (for those located in the central, southern, eastern and northern parts of Ukraine). However, according to preliminary estimates by experts, the total amount of damage to the aviation industry (airports, airfields, aviation equipment) is about \$2.14 billion.

Recovery airport infrastructure needs favorable conditions for carrying out research in the field of air transport, which is one of the most important prerequisites for the development and improvement of the air transport system of Ukraine. Modernization of airport infrastructure becomes one of the factors of increasing economic growth of Ukraine, increasing cargo and transit transportation will effectively speed up economic operations within Ukraine. It is important to take into account that the system of the state mechanism, the development of the aviation industry of Ukraine, the elements of the airport infrastructure work according to the rules of martial law.

Analysis of research and publications on the problem. Elements of airport infrastructure, application of international and European standards of civil aviation, management of infrastructure development of airports in conditions of global competition were studied by such scientists as O. Vovk, I. Geets, O. Grigorov, M. Raskalei, I. Ustinova, L. Chulinda and others. But directions of airport infrastructure development in the conditions of martial law and post-war reconstruction require further research.

The issue of restoring the infrastructure of Ukrainian airports in the special period of martial law is gaining special relevance. The full-scale invasion of the Russian Federation and the destruction of infrastructure in all areas caused unprecedented damage to our economy and our territory. Ukraine faces a difficult path of recovery from the damage caused. This process should help build a better country, taking into account international standards.

The ICAO Council condemned the violation of the territorial integrity and airspace of Ukraine and called on the Russian Federation to stop its illegal activities to ensure the safety of flights and the safety of civil aviation in all countries [4]. The International Civil Aviation Organization (ICAO), analyzing possible cases of illegal invasion of airspace that pose a serious threat to the safety and reliability of international civil aviation, develops measures and programs aimed at preventing such invasions. It was recognized that such actions are against the principles the UN Charter and the Convention on International Civil Aviation, which emphasize the need to avoid conflicts and promote cooperation between nations and peoples.

The preamble of the Convention on International Civil Aviation emphasizes that international civil aviation standards and recommended practices of ICAO are developed so that international civil aviation can develop in a safe and orderly manner, so that international air services can be established on the basis of equality by air and be carried out rationally and economically [5].

During the design and the construction of new and reconstruction of existing structures at the airport take into account the requirements to the infrastructure necessary for the optimal application of security measures of international civil aviation. The problem of modernization of airport infrastructure is relevant for Ukraine in connection with adaptation to international and European standards and



recommended practice of ICAO, taking into account the priority areas of integration and liberalization of aviation space.

Scientists draw attention to the fact that the long-term practice of applying ICAO standards has become commonplace, states make ICAO standards mandatory [6]. The standards establish certain requirements that must be fulfilled and adhered to by all states that have consented to the binding nature of the international treaty.

The state undertakes to provide the maximum possible unified approach to the rules, standards, procedures related to the infrastructure of civil aviation, in particular, aircraft, air routes, auxiliary services, characteristics of airports and landing sites, as well as other issues related to safety, regularity and efficiency of air navigation [7]. If a State finds it difficult or impossible to comply with the rules of the ICAO, it must immediately notify the International Civil Aviation Organization of the differences between its own practice and that established by the International Standard, so that the Council of the ICAO can immediately inform all other Member States of the differences that exist between the provisions of the international Standard and the corresponding national practice of this state.

Airport construction planning requirements are contained in Annex 14 of the Convention on International Civil Aviation [8], which applies to all airports open to general use in ICAO Member States and covers the area from airport planning to details such as the length of switching times for service power supply from a backup source, from civil engineering to lighting equipment, from the provision of advanced rescue and firefighting equipment to the simple requirements for cleaning airports from birds.

The content of Appendix 14 reflects the following aspects related to airports: planning, design, operation and airport equipment. The airport's large maneuvering zone starts from the runway and covers the taxiways. Today, large modern aircraft require more precise design of these elements. Failure to comply with Annex 14 may result in airports being rendered unusable.

The purpose of most standards is to improve aviation safety. One section of Annex 14 deals with the security of equipment installed at airports. Recommendations concerning the design and placement of equipment near runways, the purpose of which is to reduce the danger to the movement of aircraft, deserve attention. A description of the requirements for backup power is also provided, together with the characteristics of the lighting circuits and the need to monitor the operation of the visual aids.

Rules for determining the suitability for operation of airfields and airstrips of the state aviation of Ukraine, developed on the basis of the generalized international practice of airfield certification, the results of research on ensuring the safety of aircraft flights, taking into account regulatory documents, international standards and recommended practices of the International Civil Aviation Organization (ICAO) and approved by the Order of the Ministry of Defense [9]. The rules take into account the requirements of Appendix 14 regarding the provision of a specific plane of runways, the limitation of obstacles and the dimensions of these planes, determine the requirements for the arrangement of airfields, as well as airfields of the state aviation of Ukraine in order to ensure the safety of aircraft flights.

According to the State Targeted Development Program [10], by December 2020, it was planned to hand over runways at several airports in Ukraine (Odesa, Dnipro), in



2021, they planned to reconstruct the runway and build a new one, install lighting and radio equipment in several more airports, however, funds for the construction or restoration of airports in recent years have been diverted to the needs of combating COVID-19. The military aggression of the Russian Federation has changed the state and the nearest prospects for the development of the country's key airports, which require new calculations, new plans for restoration and construction.

Government agencies should carry out constant monitoring and control of maintenance by state aviation entities of the compliance of airfields or permanent take-off and landing sites with the requirements of normative legal acts regulating the activities of state aviation of Ukraine, and the implementation of measures that ensure the level of flight safety. Each airfield or permanent take-off and landing site, which is allowed for operation, must be checked for compliance with the current norms and rules [11]. The International Civil Aviation Organization promotes a policy of technical support in the provision of technical assistance and technical cooperation, taking into account that the reconstruction and modernization of airports can improve the economic development of states, since civil aviation plays an important role in the technical, economic, social and cultural development of all countries, and also in their global cooperation.

In 2022, Ukraine presented a plan for the post-war reconstruction of the state in the Swiss city of Lugano, the result of which was a joint declaration of 40 states on the support of Ukraine on the path of recovery after the military aggression of the Russian Federation. The recovery plan of Ukraine [12] is aimed at accelerating sustainable economic growth. The plan defines a list of National programs for achieving key results. According to the presented plan, almost half of the funds from 750 billion dollars are planned to finance the modernization of infrastructure, in particular, in the airport industry. The key source of recovery should be the confiscated assets of Russia and Russian oligarchs.

Recovery plan should be ready before the end of the war. Of course, the plan will undergo adjustments depending on different circumstances, but the reconstruction of Ukraine must begin without waiting for the end of the war. The Cabinet of Ministers of Ukraine created the National Council for the Recovery of Ukraine from the Consequences of the War [13]. Among the main tasks of the Council are the development of a plan of measures for the post-war reconstruction and development of Ukraine; definition and development of proposals for priority reforms, the implementation of which is necessary in the war and post-war periods; preparation of strategic initiatives, projects of normative and legal acts, the adoption and implementation of which are necessary for the effective work and recovery of Ukraine in the war and post-war periods.

In the post-war period, access to the airport industry will be given to international organizations that exercise control and supervision in the field of civil aviation, and it is necessary to conduct an audit of the infrastructure that ensures the execution of flights. It will take time to restore the damaged infrastructure, to test it, to get the appropriate conclusions that it works. This is a long process. Some airports will resume their work immediately, while others will need time to replace lost equipment. The restoration of airports depends on the active position of the state, stable financing, the





interest of international investors, and the solvency of citizens. Regional resorts that were prepared for concession and have great regional and economic importance (Chernivtsi, Ivano-Frankivsk, Kherson, Vinnitsa, Rivne) are of primary importance. The development of cargo air transport is also promising for the economy of Ukraine. The recovery of other airports will take place taking into account new opportunities. After recovery destroyed infrastructure, it will be time to implement plans: creation of a state specialized airport recovery fund, diversification of the tax base for aviation fuel.

The member states of the European Organization for the Safety of Air Navigation (Eurocontrol), which is engaged in supporting European aviation and works in the field of air traffic management in the European region, approved the creation of voluntary solidarity funds to support member states affected by the war [14]. Eurocontrol member states announced the creation of a voluntary Aeronautical Solidarity Fund to support Ukraine during the suspension of flights in Ukrainian airspace. In particular, this Fund will make it possible to finance measures to restore air navigation services and provide financial support to Ukraine for the period of martial law. Aware of the great impact of the war of aggression against Ukraine on air traffic on the European continent, the European Organization for the Safety of Air Navigation (Eurocontrol) stands in solidarity with Ukraine and other countries whose air traffic control services have been seriously affected. The creation of the Solidarity Fund enables collective action to be taken to provide support and funding to ensure the long-term viability of air traffic control in any affected state now and in the future. The Solidarity Fund provides support to about four thousand unique specialists in the Ukrainian aeronautical sphere, as well as to maintaining the country's aeronautical infrastructure in good condition, which has suffered significant damage over the past year. Thanks to the Solidarity Fund, Ukraine will be able to properly train personnel and prepare the aviation infrastructure for the post-war resumption of flights.

The initiatives launched in Lugano laid the groundwork for the reconstruction of Ukraine and united the world's efforts, as the scale of the stabilization and recovery needs that Ukraine needs after the Russian attacks requires a broad mobilization of states and the private sector. Ukraine benefits from international support for the economic and social stabilization of the state and the subsequent process of recovery from the consequences of the war, in particular, through emergency aid for immediate needs and funding for the participation of the private sector in the recovery process.

### **Conclusions.**

Therefore, guaranteeing high-quality airport and air navigation services requires global costs and technical calculations for the restoration of civil aviation. The state should pay more attention to issues of increasing efficiency and profitability when resuming airport service. The national transport strategy of Ukraine needs significant additions, which will contribute to the growth of economic and social development of Ukraine. Ukraine should continue contacts with international and European organizations regarding technical cooperation and technical assistance, reconstruction and modernization of airport infrastructure.

Ukrainian legislation in the field of civil aviation is at the stage of reformation in order to create conditions for stable development and increase the level of safety. In



the difficult conditions of military aggression by the Russian Federation, it is extremely important to ensure the maximum continuity of Ukraine's activities regarding the approximation of the legislation on recovery civil aviation of Ukraine to international standards. Recovery infrastructure of airports of Ukraine, taking into account international and European standards of civil aviation developed by the International Civil Aviation Organization (ICAO) is relevant for further scientific research.

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***Анотація.** У статті аналізуються міжнародні та європейські стандарти цивільної авіації та їх вплив на модернізацію аеропортової інфраструктури України, яка стає одним із факторів підвищення спроможності країни до економічного зростання. У дослідженні застосовуються порівняльний та системний методи для з'ясування суті та ефективності першочергових напрямів відновлення інфраструктури аеропортів України, враховуючи величезні збитки від повномасштабного вторгнення РФ на територію суверенної України. Модернізація інфраструктури аеропортів стає одним із факторів підвищення економічного зростання України, збільшення вантажних і транзитних перевезень ефективно пришвидшить економічне зростання всередині України. Належна реалізація стандартів і рекомендаційної практики ІКАО підвищить безпеку та ефективність аеропортової галузі, сприятиме підтримці безпечного, захищеного та сталого розвитку авіаційного транспорту.*

***Ключові слова:** аеропорти, безпека авіації, інфраструктура, інтеграція у світову економіку.*