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e-mail: support@smart-scm.org

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BORETS I.V. PhD (Pedagogical Sciences), Associate Professor, Air Transportation Management Department, State University "Kyiv Aviation Institute" (Ukraine),
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Boldyrieva M.O. PhD student, State University "Kyiv Aviation Institute" (Ukraine)

ORCID – 0000-0002-5396-8272

Researcher ID –

Scopus author id: –

E-Mail: marineboldyrieva11@gmail.com

Shevchuk D. O. Doctor of Sciences (Technology), senior scientific researcher, Professor of Air Transport Organization Department, Acting Dean of the Air Transportation Management Department of State University "Kyiv Aviation Institute" (Ukraine)

ORCID – 0000-0001-9911-7214

Researcher ID –

Scopus author id: – 55635404700

E-Mail: dmitroshevchuk@gmail.com

AIR CARGO TRANSPORTATION AS AN ELEMENT OF THE RESTORATION OF THE AVIATION SECTOR IN UKRAINE AGAINST THE BACKGROUND OF MILITARY OPERATIONS

Maryna Boldyrieva, Dmytro Shevchuk. *«Air cargo transportation as an element of the restoration of the aviation sector in Ukraine against the background of military operations».* The article examines the negative impact of military operations in Ukraine on the functioning of the aviation sector as a transport infrastructure object. There were identified the risks that exist today in connection with military actions in the country. There was substantiated the relevance of the restoration of full or partial operation of the aviation sector in Ukraine, which is one of the current urgent problems and requires a quick and optimal solution. There were proposed the stages of logistics operations for an airport carrying out only cargo transportations. There were established the prospects for optimal adjustment of airport operations for cargo transportation in wartime conditions in Ukraine.

Keywords: airport, transport infrastructure, cargo transportation, logistics, military conflict

Марина Болдирєва, Дмитро Шевчук. *«Авіаційні вантажні перевезення як елемент відновлення авіаційного сектору України в умовах воєнних дій».* У статті розглянуто негативний вплив військових дій в Україні на функціонування авіаційного сектору як об'єкта транспортної інфраструктури. Визначено існуючі на сьогоднішній день ризики, що мають місце у зв'язку із воєнними діями в країні. Обґрунтовано актуальність щодо відновлення повноцінної або часткової роботи авіаційного сектору в Україні, що є однією із нагальних проблем сьогодення і

потребує швидкого та оптимального вирішення. Запропоновано етапи логістичних операцій для аеропорта, який працює тільки з вантажними перевезеннями. Встановлено перспективи оптимального налагодження роботи аеропортів для здійснення вантажних перевезень в умовах військових дій в Україні.

Ключові слова: аеропорт, транспортна інфраструктура, вантажні перевезення, логістика, військовий конфлікт

Introduction. According to the 2025 Global Peace Index (GPI) report by the Institute for Economics and Peace (IEP), there has been a continuing decline in global peacefulness, with 59 active state-level conflicts and over 180 regional armed conflicts [1]. In addition to the enormous human suffering, armed conflicts have a negative impact on the economy through the destruction of infrastructure, the displacement and dislocation of trade, and uncertainty about the future. This, in turn, negatively affects the transport and logistics infrastructure of the state. Aviation infrastructure is particularly vulnerable: airports, cargo hubs, and air corridors are becoming targets for damage and restrictions. Under these conditions, airport logistics are forced to adapt to new realities: infrastructure destruction, airspace closures, route changes, and a high degree of uncertainty.

The protracted military operations in Ukraine have halted the work of the aviation sector in the country. Today, the question of resuming the work of some airports despite the continuation of military operations is acute.

Airports are not just infrastructure facilities, but key elements of economic, humanitarian and security strategy. Their timely reconstruction and development can ensure a country's dynamic return to normal life, increase its competitiveness in the international arena and guarantee national security.

This can be accomplished according to several different models, one of which is to envisage a partial recovery of cargo transportations first, and then, under

favorable conditions, a partial recovery of passenger transportations.

Analysis of recent research and publications. The Russian military aggression has caused significant damage to the territory of Ukraine. According to the report, which presents the results of the assessment of the losses suffered by the Ukrainian economy as a result of Russia's military aggression for the period from February 2022 to November 2024, the amount of direct damage to real estate, other infrastructure, vehicles and inventories amounted to almost \$170 billion [2].

The largest share of the total direct damage was caused to residential buildings (\$60.0 billion) and transport infrastructure (\$38.5 billion). Infrastructure facilities became one of the key areas that suffered the most attacks from the aggressor. In particular, in the first weeks of the war, Russian troops carried out massive shelling of aviation infrastructure, primarily airfields not only of military, but also of civilian and military-civilian (dual) purpose [2].

Today, despite the continued military aggression by the Russian Federation, a necessary prerequisite for the opening of any airport in Ukraine will be the decisions of the State Aviation Service of Ukraine – to open part or all of the airspace. And this will depend on the results of a thorough analysis of real risks.

In this case the military component will be essential – air defense forces and means, as well as the formation of a fundamentally new security architecture, which, through the creation of a Joint Control and Coordination Center between the military and civilians, will allow risks to be managed and minimized to an acceptable level.

The experience of actions in the world under similar circumstances has been currently studied and tried to be applied in Ukraine, actively involving international experts [3].

The purpose and objectives of the article. In current conditions, there is an urgent need to resume the aviation industry as soon as possible. However, given the existing risks, it is first necessary to establish the operation of airports exclusively for cargo transportation, which, in turn, requires a clear organization of logistics.

After all, logistics during military actions requires flexibility, rapid adaptation to new conditions, and coordination with armed forces.

In the study „Examining Airport Agility at Air Cargo Hub Airports“ there was shown that the agility of a cargo hub airport depends on digital transformation, flight services, information exchange, and infrastructure availability. In a military context, these factors become even more significant, as infrastructure is under threat, routes are disrupted, and rapid logistics restructuring is required [4].

Basic material and results. Since February 24, 2022, the safe operation of civil aviation ports for the transportation of passengers and cargo has become impossible. The aviation sector in Ukraine is currently going through a difficult stage of its existence. However, despite all the existing challenges, the industry continues to function.

It is known that airports are compound complexes with infrastructure and rolling stock that require constant maintenance and keeping in proper working condition. The necessity of it is evident, since it is essential to maintain the qualifications of workers and still carry out transportations in the future; it is required to take care of the infrastructure constantly, to implement a set of measures to maintain the operational and technical suitability of the airport.

Also, one of the main reasons for the continued operation of airports is a security

reason – to prevent extraordinary accidents and events of a technogenic nature that may occur during shelling. This especially applies to airports with the status of critically important facilities: the state airport „Boryspil“ and the Lviv airport named after Danylo Halytsky [5]. Their preservation is a priority issue in terms of security. Thus, the entire period since the beginning of the war, the airport’s operational activity has been taking place without being noticeable from the outside [6].

Currently, the import and export of goods from remote countries of the continent, as well as from the USA, is carried out by multimodal transportation using aviation and road transport [7; 8].

In modern conditions, logistics chains are forced to change routes and look for alternatives, which increases costs and reduces efficiency. Cargo operations are transferred through neighboring countries, ground transportation is used after air hubs abroad.

A previous analysis of cases of civilian aircraft being shot down over conflict zones in the past shows that there is no practice of mandatory complete closure of airspace.

Today, flights can also be carried out from airports classified as the highest risk. For example, flights to Iraq are operated by airlines from Middle Eastern countries; a few local carriers operate flights to airports in Yemen and Libya [9].

During wartime, the importance of aviation logistics increases: cargo flights, humanitarian aid, and military supplies require fast and reliable movement. Therefore, given the above, there is confidence that airports may yet transition to cargo operations during wartime in Ukraine. It is worth noting that during military operations, the optimization of airport operations for cargo transportation has its own specifics – priorities shift from commercial efficiency to stability, security, and flexibility of logistics chains.

There are proposed stages of logistics operations for an airport carrying out only cargo transportation (Table 1).

Table 1. Logistics operations stages for an airport handling only cargo

Stage	Definition	Resources and infrastructure	Responsibility
1. Cargo acceptance	Cargo arrives at the airport via trucks, trains or airplanes.	Unloading zones, transport corridors, air defense for infrastructure protection.	Logistics services, security services.
2. Cargo sorting	Cargo is divided into humanitarian, military and commercial categories.	Sorting lines, automated WMS (Warehouse Management systems).	Warehouse staff, WMS operators.
3. Cargo storage	Temporary placement of goods in warehouses or mobile containers.	Reinforced warehouses, cold storage rooms for perishable goods.	Warehouse managers, security.
4. Customs clearance	Inspection and registration of cargo, simplification of procedures for humanitarian aid.	Separate customs zones, inspection equipment.	Customs services.
5. Loading cargo for delivery	Preparation of cargo for transportation (cars, trains, planes).	Loading zones, lifts, conveyors.	Loading operators.
6. Cargo distribution	Delivery of goods to final destinations.	Truck routes, railway junctions, air corridors.	Logistics coordinators
7. Monitoring and reporting	Cargo tracking using GPS and RFID, analysis of operational efficiency.	Information systems, IoT (Internet of Things) devices for tracking.	Analysts, monitoring operators.

Source: compiled by the authors

Logistics in such work will be aimed at receiving, storing and sending humanitarian, military and critical cargo, organizing reserve

warehouses and delivery routes, and quickly reconfiguring processes to change supply directions.

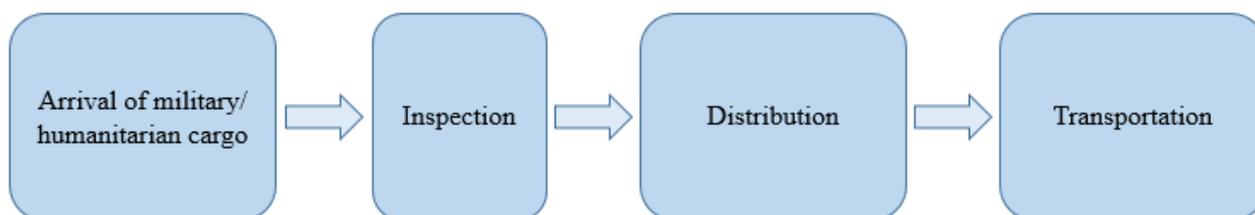


Figure 1 – Scheme of the cargo receiving and handling process

Source: compiled by the authors

The process of receiving and processing cargo (Fig. 1.) ensures the efficient delivery of military and humanitarian cargo and includes the following stages:

- arrival of cargo (at this stage, the vehicle with the cargo arrives at the unloading area, where the goods are registered and documents are checked);

- control and inspection (the process of checking the cargo takes place, which involves scanners, service dogs, x-rays and ist division into military and humanitarian supplies);

- distribution by storage zones (accordingly, military cargo is sent to special

hangars, and humanitarian aid, in other turn, is distributed among warehouses);

- preparation for shipment (including the formation of batches of goods, packaging and labeling, as well as loading into transport – air or road) [7].

It is obvious that in peacetime operational or financial risks are crucial, but in wartime they become systemic, interconnected and directly affect the safety of personnel, the stability of infrastructure and the efficiency of logistics processes [10].

A comprehensive understanding of these threats is a key condition for developing an effective risk management system that will ensure the continuity of logistics processes, which have always been accompanied by a number of diverse risks, and with the outbreak of the war, their number, probability of occurrence, and severity of consequences have increased many times over.

In the table below (Table 2) there are presented the main types of risks arising from the operation of airports caused by war.

Table 2. Classification of the main risks that arise during the operation of airports in wartime

Risk category	Description	Possible consequences
Security risks	Shelling, sabotage, missile strikes	Destruction of infrastructure, human casualties
Logistical risks	Airspace closure, route disruptions	Supply disruption, cargo losses
Technological risks	IT systems failure, cyberattacks	Management violations, information leaks
Financial risks	High costs for repairs, security and insurance	Unprofitability, need for governmental support
Operational risks	Shortage of fuel, personnel, equipment	Capacity reduction
Social risks	Evacuation, stress, decreased motivation	High employee turnover

Source: compiled by the authors

It can be seen that it poses a significant threat to the stable operation of airports. However, it should be noted that over three years of full-scale Russian invasion, most enterprises have been able to withstand numerous challenges and continue their activities; and given the above, such a development is possible for the aviation sector.

Conclusions. Safe airport operations during wartime require a combination of military control, modern technology, flexible routes, and airspace protection. The

experience of other countries can be adapted in Ukraine to organize closed but controlled air traffic.

Currently, it is not spoken about restoring the volume of Ukrainian air traffic that existed before the Russian invasion. However there is a possibility of transferring airports to cargo operations – one way to preserve the functionality of the air hub and maintain the country's logistics. And this, in turn, will make it possible to modernize the infrastructure and prepare for post-war recovery with an improved logistics base.

References

1. „The Great Fragmentation“ Driving Conflict: World Peace Plummet (2025, June 18). Vision of Humanity. <https://www.visionofhumanity.org/the-great-fragmentation-driving-conflict-world-peace-plummet/>
2. Andriienko D. et al. (2024). Report on damages to infrastructure from the destruction caused by Russia's military aggression against Ukraine as of November 2024. Kyiv School of

economics. https://kse.ua/wp-content/uploads/2025/02/KSE_Damages_Report-November-2024-UA.pdf.

3. Airport Boryspil (2025, February 14). Ukrinform. <https://www.ukrinform.ua/tag-aeroport-borisypil>
4. Hong, Seock-Jin & Kim, Woongyi & Hiatt, Brian (2025). Examining airport agility at air cargo hub airports. *Journal of Air Transport Management*, Elsevier, vol. 122.
5. Government portal. <https://www.kmu.gov.ua/>
6. Zakon Ukrainy „Pro krytychnu infrastrukturu“ vid 16.11.2021, 1882-IX / Vidomosti Verkhovnoi Rady 2023.
7. Puente-Mejia B., Lange A. (2025). Characterizing global air cargo: A study profiling air cargo operations worldwide. *Journal of Transport Geography*, Vol. 127.
8. Aviaperevezennia vantazhiv u voiennyi chas (n.d.). Avialohistyka. <https://aclogistic.ua/aviaperevezennya-vantazhiv/>
9. Korba G. (2022). Yak ukrainski aviakompanii zarobliaiut i zanepadaiut pid chas viiny. BBC News Ukraine. <https://www.bbc.com/ukrainian/features-63403865>.
10. International Air Transport Association (IATA) (2022). Risk Management Framework for Aviation. IATA.