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Improving the monitoring of the operational and technical condition of rigid airfield pavements

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An analysis of domestic and foreign methods for assessing the operational and technical condition of airfield pavements is given. The essence of the ACN-PCN method for determining the bearing capacity of airfield pavements is described. It has been established that over a long period of the airfield pavement operation of the "Mykolayiv International Airport" under the natural influence, climatic and operational factors, destructions were formed on the pavement, which is distinctive for each type of artificial pavement of the runway, taxiway and apron. Based on the monitoring results, a forecast was made for the operational and technical condition of the rigid airfield pavements of the Mykolayiv International Airport.

Keywords: runway, apron, rigid airfield pavement, inspection, monitoring, operational and technical condition

Удосконалення моніторингу експлуатаційно-технічного стану жорстких аеродромних покриттів

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Наведено аналіз вітчизняних та закордонних методик оцінювання експлуатаційно-технічного стану аеродромних покриттів. Викладено суть методу ACN-PCN при визначенні несучої спроможності аеродромних покриттів. Розглянуто можливості обмеження повітряних суден за масою та інтенсивністю польотів. Розглянуто і проаналізовано літературні джерела, присвячені питанням класифікації пошкоджень і дефектів аеродромних покриттів та дослідженню причин їх виникнення. Встановлено, що за тривалий час експлуатації аеродромних покриттів «Миколаївського міжнародного аеропорту» під негативним впливом природно-кліматичних та експлуатаційних факторів на покритті утворились руйнування, що характерні для кожного типу штучного покриття злітно-посадкової смуги, руліжної доріжки А (РД-А) та перону. Основними видами руйнувань на аеродромі є: викришування асфальтобетону, відображені наскрізні тріщини, сіткоподібні тріщини, поздовжні тріщини на місцях технологічних швів при укладанні асфальтобетонної суміші. Наведено класифікаційні числа ACN літаків, які експлуатуються на аеродромі «Миколаївського міжнародного аеропорту. Визначено класифікаційні числа PCN покриттів перону, злітно-посадкової смуги та руліжної доріжки А. За результатами проведеного моніторингу виконано прогноз експлуатаційно-технічного стану жорстких аеродромних покриттів «Миколаївського міжнародного аеропорту». Встановлено, що виконання злітно-посадкових операцій літака B737-900 з ACN=51 на злітно-посадковій смузі «Миколаївського міжнародного аеропорту» здійснюється з коефіцієнтом перевантаження 1,46. Обгрунтовано доцільність проведення капітального ремонту чи реконструкції аеродрому «Миколаївського міжнародного аеропорту». Надано пропозиції і рекомендації щодо відновлення експлуатаційно-технічного стану аеродромних покриттів на прикладі «Миколаївського міжнародного аеропорту».

Keywords: злітно-посадкова смуга, перон, жорстке аеродромне покриття, обстеження, моніторинг, експлуатаційно-технічний стан

Introduction

The parameters non-compliance of artificial airfield pavements with the requirements of regulatory documents is due to the fact that airfields in Ukraine were designed and built more than 20 years ago and have got significant wear [1, 2]. Mykolayiv International Airport is no exception, where during the operation, under the negative influence of natural, climatic, and operational factors, the pavement destruction was formed, which is characteristic of each artificial surface type.

The development program of the municipal enterprise "Mykolayiv International Airport" provides the decision of questions concerning air services rendering restoration, maintenance of high-quality passengers' service, infrastructural area development, an increase of air company work efficiency, and investment attractiveness improvement. This is impossible without inspection and assessment of the current artificial pavements technical condition of the runway, taxiway A (TW-A) and the platform.

The municipal enterprise "Mykolayiv International Airport"is a production system consisting of the airfield, airport, and ground complexes, which provides air transportation, flight safety, and passenger, cargo, and baggage handling on the ground.

In the near future, the "Mykolayiv International Airport" is planned to become the leading cargo and passenger airport in the south of Ukraine. The technical airport capabilities make it possible to accept all types of civil aircraft.

The length of the airport runway is 2555 meters and the width is 44 meters. The airport includes a passenger terminal with an area of 3800 m^2, which is designed to serve 430 passengers per hour with a capacity of 45 aircraft per day, and a cargo terminal with an area of 720 m^2, designed to serve 100 tons of cargo.

Technical aerodrome capabilities of the "Mykolaiv International Airport" allow receiving aircraft types AN-124 ("Ruslan"), IL-76, TU-154, TU-134, AN-12.

The "Mykolayiv International Airport" has sufficient potential to develop its own business and tourist passenger flow. Mykolayiv city is a sea and river port, located at the intersection of seven air corridors.

The municipal enterprise "Mykolayiv International Airport" has all possibilities as an important transit hub in the south of Ukraine.

The main element of the aerodrome, which is designed for takeoff and landing of aircraft, is the runway with artificial or other types of coverage [3, 4, 5].

The following types of airfield pavements are used at Ukrainian airfields: monolithic cement concrete, prefabricated PAG-type slabs (smooth airfield slabs), and asphalt concrete. The current situation at Mykolayiv International Airport due to the low quality of the pavements' layers and non-compliance of design parameters with the requirements of domestic and foreign regulations, all of which reduce the durability of airfield pavements with an increase in the number of takeoff and landing operations.

Review of research sources and publications

Assessment of the transport and operational condition of Civil Aviation aerodrome pavement is performed in accordance with domestic and foreign regulations [1-8] and includes the qualitative and quantitative assessments.

Qualitative assessment is performed to determine the suitability of the given aircraft type bearing capacity by comparing the *ACN* aircraft classification numbers and the *PCN* pavements bearing capacity at the same soil base strength.

The international *ACN-PCN* method, which provides information on the bearing capacity of artificial airfield pavements and determines the possibility of operating different types of aircraft on them, is to compare the classification numbers of *ACN* and *PCN*. The *ACN* number indicates what load is transferred from the aircraft to the pavements, and the *PCN* number in each case characterizes the pavement bearing capacity.

The *PCN* number must be determined according to the procedure described in [5, 7, 8].

The purpose of the *ACN-PCN* method is:

– to inform aerodrome users about the pavements bearing capacity (by publishing special indexes – indicators of the pavements bearing capacity);

– determination of the possibility and operation conditions on the airfields pavement of specific aircraft types.

Indicators (indices) of the bearing capacity of pavements intended for the operation of aircraft weighing more than 5700 kg must contain:

– pavement classification number *PCN*;

– pavement type code (rigid or non-rigid);

– code of the strength category of the pavement base;

– category code of the maximum allowable air pressure for the pavement in the tires of the aircraft wheels;

– code of the method for assessing the pavement bearing capacity.

According to the explanations in paragraphs 1.1.2.1 and 1.1.3.2 "d" of the ICAO document [8], the PCN classification numbers are calculated by the formula

$$PCN = 0.204\ P_n\ , \qquad (1)$$

where P_n – the maximum allowable single-wheel load for pavement (kN) at an air pressure in the wheel-tire of 1,25 MPa.

When determining the numbers using the above formula, the methodology for calculating the airfield pavements strength in accordance with the provisions of the current regulations [4] and its accompanying manual [9] should be used. In this case, it is necessary to first determine the design value of the single-wheel load P_p (corresponding to the existing pavement design), and then by introducing the unloading factor γ_f and the dynamic factor k_d, the standard value P_n is obtained.

The classification number of the pavement must not be lower than the classification number of the aircraft operating on the pavement

$$K \cdot ACN \le PCN\ , \qquad (2)$$

where *K* – coefficient that takes into account the intensity of aircraft traffic.

If condition (2) is not met, it is necessary to introduce restrictions on the mass of aircraft and reduce the intensity of takeoffs and landings.

ACN classification numbers for different aircraft types are calculated by aircraft design departments in accordance with the ICAO Unified Methodology set out in [8] and are included in the aircraft passport data, which are mandatory when adjusted in different countries.

According to the ICAO method, the calculation of *ACN* numbers is based (paragraph 1.1.3.2 "e" [5]) on the definition of the aircraft for the so-called reduced single-wheel load (at a tire pressure of 1,25 MPa), which by its force on the pavement is equivalent to actions of the real main support of the aircraft chassis (taking into account the number and location of the wheels in the plan and the air pressure in their tires according to the aircraft technical characteristics).

If condition (2) is not met, it is necessary to determine the possibility of operating the aircraft on the surface with the introduction of one of three options for limiting this operation:

– restrictions on the mass of the aircraft (without limiting the intensity of its flights)

– restrictions on the intensity of aircraft flights (without limiting its maximum mass);

– comprehensive restrictions on the mass and intensity of aircraft flights.

The mass limits for the designated aircraft are determined in accordance with Annex 4, paragraph 4 [7], by linear interpolation of the *ACN* values between the empty mass of the aircraft and its maximum mass

$$m_{perm} = m_1 - \frac{(m_1 - m_2)(ACN_1 - PCN)}{ACN_1 - ACN_2}, \qquad (3)$$

where m_{perm} – permissible aircraft mass which is allowed to operate without limiting the intensity of its flights, kg;

m_1 – maximum aircraft mass, kg;

m_2 – the mass of an empty aircraft, kg;

ACN_1 – classification number of the aircraft with maximum mass (accepted taking into account the codes of the pavement type and its base strength categories);

ACN_2 – classification number of an empty aircraft (accepted taking into account the codes of the pavement type and its base strength category).

Restrictions on the flight intensity of aircraft allow (in accordance with the provisions of Annex 4 paragraph 3 [7]) to operate aircraft on the pavement with maximum mass, based on the following calculated values of the PCN / ACN_1 ratio:

– on rigid pavements, when the condition $1,0 > PCN/ACN_1 \geq 0,85$ is met, it is advisable to limit the total intensity of aircraft flights to 10 aircraft departures per day; at $0.85 > PCN/ACN_1 \geq 0,80$ – two departures per day; at $0.80 > PCN/ACN_1 \geq 0,75$ – one flight departure per day;

– on non-rigid pavements at $1.0 > PCN/ACN_1 \geq 0.80$ it is advisable to limit the total intensity of aircraft flights 20 aircraft departures per day; at $0.80 > PCN/ACN_1 \geq 0.70$ – five departures per day.

Comprehensive limitation on the mass and intensity of aircraft flights allows to increase its permissible weight during aircraft operation on the pavement

$$m_{perm} = m_1 - \frac{(m_1 - m_2)(ACN_1 - PCN / k_n)}{ACN_1 - ACN_2}, \qquad (4)$$

where k_n – adjustment factor that takes into account the limitation of aircraft flight intensity (depending on the values of the PCN/ACN_1 ratio).

The coefficients k_n should be taken as follows:

– for rigid pavements $k_{10} = 0.85$, $k_2 = 0.80$, $k_1 = 0.75$;

– for non-rigid pavements – $k_{20} = 0.80$ and $k_5 = 0.70$.

The numerical indexes of the coefficient k_n indicate the maximum allowable number of flights per day.

Modern methods of assessing the operational and technical condition of rigid airfield pavements take into account the different number of damages and defects, and therefore it is necessary to consider the airfield artificial pavements' damage and defects and the reasons for their occurrence.

As a result of the impact on the airfield pavements of the whole complex of operational loads and natural and climatic factors in the upper layer is the formation of a microcracks network, which cannot be distinguished with the naked eye. This process gradually develops continuously during the entire period of pavement operation. Gradually, a network of cracks appears on the pavement, which can be seen with the naked eye. This process develops continuously throughout the life of the coating. Gradually, a visible network of cracks appears on the coating, which then turns into the local pavement destruction. Local destruction gradually turns into continuous pavement destruction, which spreads in-depth, shaking the structure of the lower pavement layers, growing into forceful destruction of the airfield pavements surface.

The works [2, 6, 10-18] are devoted to the issue of classification of airfield pavements damages and defects and research of reasons for their formation.

Problem statement

The aim of the study is to monitor and predict the performance of airfield pavements in the example of the "Mykolayiv International Airport".

The pavement of the runway, taxiway A and the "Mykolayiv" airfield apron, was built in 1974-1976 yy. from monolithic cement concrete on an artificial basis of soil cement. The cement concrete pavement is divided by expansion joints into slabs 5×3.5 m in size.

In 1988, the runway pavement, taxiway A and part of the apron (aircraft stands 7-9) were reinforced with two-layer polymer asphalt concrete with reinforcement between the layers (in some areas) by geosynthetics.

In 2017, the destroyed layers of asphalt concrete pavement were replaced on the runway, taxiway A and the apron.

During operation, under the negative influence of natural, climatic, and operational factors, the destructions that are characteristic of each type of artificial pavement were formed.

At the MS 7-9 aircraft stands, where in 1988 the pavement was reinforced with asphalt concrete, over the 30-year period of destructive operational factors, the asphalt concrete layer destruction has occurred, which is largely due to the natural “aging” process of the bitumen-polymer binder. Such destruction is the crushing of asphalt concrete, various kinds of cracks, etc.

On the cement-concrete pavement of the apron (aircraft stands 1-6), almost all types of destruction characteristic of rigid airfield pavements occurred: longitudinal and transverse through cracks, the slabs surface destruction, and others.

The scheme of the comprehensive plan of the "Mykolayiv International Airport" airfield is given in Fig. 1. The design of artificial airfield pavements is shown in Table 1.

The pavement of the runway and taxiway A has a gabled cross-section. In a short operation time, these pavements have not acquired significant damage and defects, except for a few through "reflected" cracks. The cracks' width is up to 2 mm, the destruction of the edges of the cracks was not detected. The damage degree to the pavement of the runway and taxiway A is low.

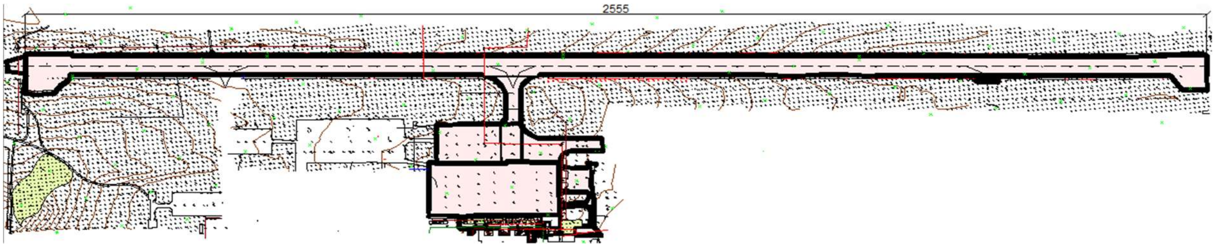

Figure 1 – The scheme of the comprehensive plan of the "Mykolayiv International Airport" airfield

Table 1 – Artificial pavements constructions of the "Mykolayiv International Airport"

Airfield elements	Structural pavement layers (year of construction, last repair or reconstruction of the pavement)	Thickness, cm	Airfield pavement destruction category according to [4]
Runway with artificial pavement PK0-25 + 55	Asphalt concrete grade I, type B (2017) Cement concrete M400 Soil cement M75	12 24 16	«low»
Taxiway A	Asphalt concrete grade I, type B (2017) Cement concrete M400 Soil cement M75	12 24 16	«low»
Apron Continuation of the taxiway on the apron	Asphalt concrete grade I, type B (2018) Cement concrete M400 Soil cement M75	12 24 16	«low»
Apron Aircraft stand AS1-AS6	Cement concrete M400 (1975) Soil cement M75	24 16	«medium»
Apron Aircraft stand AS7-AS9	Asphalt concrete grade I, type B (1988) Cement concrete M400 Soil cement M75	12 24 16	«high»

In fig. 2 is shown the damage and defects of the "Mykolayiv International Airport" runway pavements.

Some of the artificial apron pavements, namely AS 1-6, have never been overhauled or reconstructed.

Over many years of operation under the negative influence of climatic and operational loads, damage and destruction occurred on the pavement, which is typical for rigid airfield pavements: through cracks, chipping, sagging, peeling concrete surface, shrinkage cracks, destruction of sealing layer in other layers, etc.

Up to 10% of the apron pavement slabs have areas of peeling of the concrete surface to a depth up to 1-2 cm.

Up to 20% of apron pavement slabs have through longitudinal and transverse cracks with an opening of up to 2 mm.

The damage degree to the apron pavement can be classified as medium. The main types of destruction on the platform are: asphalt concrete chipping, reflected through cracks, mesh-like cracks, and longitudinal cracks in places of technological seams when laying asphalt concrete mixture.

Damage and defects of platform coverings of the "Mykolayiv International Airport" are given in fig. 3-4.

Underlying soils for airfield pavements are loams, which are characterized by reduced load-bearing capacity and have subsidence properties of type 2 from the additional load at full water saturation. According to the materials of engineering and geological research, groundwater to a depth of 10 m was not detected, and waterlogging for other reasons in this case is unlikely. For the runway, taxiway A and the apron, the ground strength code is defined as "A" (high).

Figure 2 – Damage and defects of the "Mykolayiv International Airport" runway pavement

Figure 3 – Damage and defects of the "Mykolayiv International Airport" apron

Figure 4 – The "Mykolayiv International Airport" apron pavement crack grid

Basic material and results

PCN classification numbers for the apron pavement at AS 1-6 aircraft stands were determined by calculation and analytical methods.

According to the recommendations of paragraphs 5.38 and 5.68 [4], the current degree of these pavement wear was duly taken into account, depending on the signs of concrete slab structures destruction, which were found during the inspection of operational and technical pavements condition.

The *ACN* classification numbers (as indicators of aircraft pavement loads) for each given type of aircraft were taken as their technical characteristics according to code R (rigid pavement) and code B (in accordance with the calculated value of the pavement subgrade coefficient). The values of the accepted *ACN* numbers are given in table 2. The results of determining the pavement bearing capacity by the method of *ACN-PCN*, obtained for the "Mykolayiv International Airport" airfield, are shown in table 3.

In assessing the pavement bearing capacity, their *PCN* classification numbers were compared with the *ACN* aircraft classification numbers that can perform take-off and landing operations on this pavement. At the *ACN/PCN* ratio, the traffic limit of such aircraft was calculated, as well as the possibility of operation with the maximum take-off weight limitation. Considering the likelihood of increased coverage and the number of takeoffs and landings by aircraft with *CAN* > *PCN*, overcapacity aerodrome operations may occur. It should be noted that according to [8], under certain conditions, flights are allowed even with *ACN* limits. However, the loads from aircraft must in no case exceed the permissible (for a given aircraft type) for all pavements by more than 50%, except for aprons, where such excesses are limited to 20%.

For instance, the takeoff and landing operations of the aircraft B737-900 with *ACN*=51 on the runway of the "Mykolayiv International Airport" airfield are carried out with a reload factor of 1.46 (no more than 50%).

Further, after performing take-off and landing operations by aircraft with overloads, it is necessary to conduct additional inspections of pavements to establish any deterioration of their condition. In the event of new defects (through cracks, splitting and slab edges and corners chipping, subsidence), which can lead to unacceptable damage to the pavement and endanger flight safety, it is necessary to suspend takeoff and landing operations and perform necessary repairs.

In the event of a significant increase in the load on the pavement and the number of take-off and landing operations by aircraft, the formation of new destruction or significant development of existing ones, major repairs or reconstruction, it is necessary to conduct the survey and assess the technical condition of airfield artificial pavement, analyze flight intensity types of aircraft and perform the new calculation of *PCN* classification numbers.

Table 2 – *ACN* classification numbers for given aircraft types

Type of aircraft	Maximum mass of the aircraft, t The empty plane mass, t	Air pressure in the tires of the wheels, MPa	*ACN* for rigid airfield pavements (code R) and medium strength of soil bases
Il-62	162.6/66.4	1,08	50/15
Il-76TD	191/87.2	0,686	36/14
Il-76 T	171/83.8	0,588	32/13
Tu-154M	98/53.5	0,932	25/10
AN-24	398/180	1,10	48.4/15.9

Table 3 – Results of *PCN* classification numbers determination of the "Mykolayiv International Airport" airfield

Airfield elements	Pavement type	Classification number of pavement
Runway with artificial pavement PK 20-PK25+55	Cement concrete reinforced with asphalt concrete in 2017 based on soil cement	PCN 35/R/A/X/T
Taxiway A	Cement concrete reinforced with asphalt concrete in 2017 based on soil cement	PCN 35/R/A/X/T
Apron Aircraft stands AS 1-9	Cement concrete reinforced with asphalt concrete in 1988 based on soil cement	PCN 32/R/A/X/T

Cracks repairing must be carried out in dry weather in spring or autumn in the morning when the cracks opening is maximum. Cracks up to 5 mm are cleaned by purging with compressed air and filled with hot bitumen BND 60/90, BND 90/130, sprinkled with dry sand, and rolled with small rollers. Cracks up to 15 mm are cleaned with mechanical brushes or a jet of hot air under a pressure of 6 atm., purged with compressed air and filled with polymer mastics. Cracks larger than 15 mm are cleaned, purged, primed with special polymer primers and filled with polymer-bitumen mastic or mineral-mastic mixture. The requirements for preparing surfaces for repair depend on the type of used material. Fast-hardening high-grade concrete mixtures are used as a repair material. Such concrete is prepared based on mineral binders, as well as on the basis of natural and synthetic resins, which, subject to technological requirements during repairs, must provide a tensile strength of at least 1.5 MPa.

Due to the significant percentage of the affected apron slabs and the depth of destruction, the performance of work with large volumes, methods and repair materials for urgent ongoing repairs - is impractical. It is also necessary to ensure the bearing capacity of the apron pavements to the level of the artificial runway with a rigid pavement. Taking into account the above, for apron artificial pavements, it is necessary to carry out a major repair or reconstruction with the reinforcement of existing pavements with rigid or non-rigid type layers.

To ensure the durability and operational reliability of the airfield pavement of the "Mykolayiv International Airport", it is necessary to perform:

- the first option is to mill the top layer of the pavement to the full thickness and restore it using the cold recycling method and lay on top of one or two layers of type B dense asphalt concrete on modified bitumen. The use of crushed stone-mastic asphalt concrete as a layer of additional substantiation. This option is recommended for major overhauls. To reduce the likelihood of reflected cracks, it is advisable to reinforce with geosynthetic materials, especially in the most loaded areas. The thickness and characteristics of the layers are specified during the development of design and estimate documentation for the current repair of airfield pavements;
- the second option - milling the top pavement layer, performing, if necessary, repair work on the lower layer with reinforcement in the cracks and seams area and laying the top pavement layer from a new asphalt mixture on polymer-modified bitumen or with the addition of natural bitumen.

Table 4 – Results of determining the pavement bearing capacity and recommendations on the possibility of operating aircraft

Pavement area	The pavement bearing capacity index	Aircraft types and their maximum *ACN* classification numbers in brackets	The ability to operate the aircraft on the pavement
Runway with artificial pavement, Taxiway A, apron, Aircraft stands area AS-7 - AS-9	24/R/B/X/U	An-124 (48,4)	Operation is allowed: with a mass of up to 234.3 tons - no more than 10 flights per day; with a mass of up to 288.0 tons - no more than 1 flight per day. Operation with a mass of more than 288.0 tons is not allowed.
		Il-76TD (36)	Operation is allowed: with a mass of up to 134,4 tons – no more than 10 flights per day; with a mass of up to 172,1 tons – no more than 1 flight per day. Operation with a mass of more than 172,1 tons is not allowed.
		Il-76T (32)	Operation is allowed: with a mass of up to 134,3 tons – no more than 10 flights per day; without mass restrictions – no more than 1 flight per day.
		Il-62 (50)	Operation is allowed: with a mass of up to 91,1 tons – no more than 10 flights per day; with a mass of up to 113,1 tons – no more than 1 flight per day. Operation with a mass of more than 113,1 tons is not allowed.
		Tu-154 (25)	Operation is allowed: with a mass of up to 95,0 tons – no more than 10 flights per day; without mass restrictions – no more than 1 flight per day.
Apron: aircraft stands area AS-1 – AS-4	13/R/B/W/T	An-124 (48,4)	Operation is allowed: with a mass of up to 189,6 tons – no more than 1 flight per day; Operation with a mass of more than 189,6 tons is not allowed.
		Il-76ТД (36)	Operation is allowed: with a mass of up to 102,9 tons – no more than 1 flight per day. Operation with a mass of more than 102,9 tons – is not allowed.
		Il-76T (32)	Operation is allowed: with a mass of up to 103,7 tons – no more than 1 flight per day. Operation with a mass of more than 103,7 tons is not allowed.
		Il-62 (50)	Operation is allowed: with a mass of up to 72,8 tons – no more than 1 flight per day. Operation with a mass of more than 72,8 tons is not allowed.

Conclusions

During the operation of the airfield pavements of the "Mykolayiv International Airport", a large number of destructions were formed. It has been established that 10% of the apron pavement slabs have areas of peeling of the concrete surface up to 1-2 cm deep and 20% of the apron pavement slabs have through longitudinal and transverse cracks with opening up to 2 mm.

A visual inspection of the operational and technical condition of rigid airfield pavements showed the presence of various types of cracks and chips.

Based on the comparison of certain *PCN* classification numbers of artificial pavements of the "Mykolayiv International Airport" with the *ACN* aircraft classification numbers calculated by aircraft designers for the corresponding base strength code, recommended modes of artificial pavements operation have been developed. The recommended modes of pavements operation for aircraft are developed by comparing *ACN* and *PCN*, taking into account only the bearing capacity of these pavements.

For aircraft with a ratio of: $1 > PCN / ACN > 0.85$ it is recommended to limit the average daily intensity to 10 flights per day; at $0,85 > PCN / CAN > 0,8$ – no more than two; one-time emergency landings are allowed at $PCN / ACN > 0.6$.

Practical recommendations for use at airfields have been developed, which makes it possible to quickly assess the operational and technical condition of airfield pavements, to create the most favorable method of carrying out repair measures to maintain the pavements in satisfactory condition.

Based on the safety requirements for takeoff, landing and taxiing of aircraft on the airfield pavements at the "Mykolayiv International Airport", it must be considered mandatory to carry out urgent repairs to the pavement surface, especially the runway, RD-A and apron areas where located AS 5-9 aircraft stands, in order to eliminate the most dangerous for aircraft destruction types of the upper layers of asphalt polymer concrete and concrete pavement on MS-5 and MS-6.

Such destruction types, first of all, include numerous cracks in asphalt polymer concrete and the potholes' presence on its surface and areas with chipping materials, chipped edges of concrete slabs, slabs subsidence, the presence of obsolete sealants in the expansion joints of concrete coatings. These types of pavements destruction constantly produce foreign objects on their surface, which can be sucked in with air into the engines of modern aircraft. This is very dangerous for aircraft with a low engine position, and therefore it is considered appropriate to prohibit this type of operation until the top layer of polymer asphalt pavements is repaired.

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