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PROBLEMS OF THE IMPROVEMENT OF ESTIMATION, ACCOUNT, ANALYSIS AN--ETC(U)
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FOREIGN TECHNOLOGY DIVISION

PROBLEMS OF THE IMPROVEMENT OF ESTIMATION, ACCOUNT, ANALYSIS AND FORECASTING THE PRIME COST OF AIR TRANSPORTATION

by

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PROBLEMS OF THE PRIME COST OF AIR TRANSPORTATION.

Problems of the ~~perfection~~/improvement of estimation, account, analysis and forecasting the prime cost of air transportation.

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(RKIIGA).

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The problems of the correct calculation/enumeration of the prime cost of air transportation appear in all stages of the life of the flight vehicle: with the technical and economical research on air report/communications, at the stage of the designing of airplane, during its production, in the period of the exploitation of aircraft in the enterprises of the civil aviation and even at the moment/factor of its writing off. The correct definition/determination of the level of the prime cost of air transportation makes it possible to scientifically soundly solve a

whole series of the important questions of the economy of the air transport:

a) to select the most economical type of airplane at the stage of designing and with the technical and economical searches of air traffic;

b) to determine the economically rational spheres of the application/use of different aircraft types in dependence from the distance of transportation, power of gruzo- passenger flow, Rayon of the basing of the enterprise and other factors; to create on this basis the optimal schematics of the arrangement of aircraft on lines, the affixing of aircraft maintenance bases after the administrations of the civil aviation, etc;

c) to determine the economically rational spheres of the application/use of an air transport in single transport system, contributing thereby to the solution of the problem of the optimal distribution of transportation according tc the forms of transport;

d) correct to build system and to establish/install the magnitude of the tariffs of air transport;

e) to improve complete and internal eccnomic crew in the enterprises of the civil aviation in part of the covariation of income and flow rates of operational enterprises;

f) to plan the sound ways of lowering the prime cost of air transportation, which is especially important for the air transport, which has the sufficiently high prime cost of transportation;

g) to improve the procedure of setting values of the mastered flight resource aircraft engines, transmitted by the civil aviation into other branches of national economy for utilization as ground-based installations, and a whole series of other questions.

It should be noted that the questions of the correct calculation/enumeration of the prime cost of air transport, unfortunately still not found on the air transport of complete completion both in part of the theoretical studies and in practical application/use, but often they are found in embryonic state. In these questions the air transport considerably delays behind rail, marine and river transport, and along series of problems - even behind the automobile.

In connection with the transition of the enterprises of the civil aviation to the new system of management the attention to the questions of the perfection/improvement of account, estimation and analysis of the prime cost of air transportation not only is not attenuate/weakened, but it is strengthened.

Therefore the correct calculation/enumeration of the prime cost of air transportation and another types of operation on the application/use of an aviation in national economy is the important problem of today.

In the oblast'/area of the prime cost of air transportation now it is possible to outline a whole series of the important problems, which have both large theoretical and especially practical significance.

A. At the stages of designing, production and repair of aircraft.

1. Perfection/improvement of the procedure of the definition/determination of the prime cost of air transportation at all stages of designing the airplane.

2. Perfection/improvement of the procedure of the definition/determination of the cost of the production of airplanes and engines.

3. Development of the ways of lowering the prime cost of the production of aircraft and engines.

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4. Ways of the utilization of laws governing the formation of flow rates for the production of aircraft and engines for setting the scientifically sound values of aircraft and engines.

5. Perfection/improvement of the methods of the definition/determination of the prime cost of the major overhaul of aircraft and engines, the utilization of these methods for setting the scientifically sound values of major overhaul.

B. At the stage of the exploitation of aircraft.

1. Perfection/improvement of the grouping of operating costs on the articles of calculation and economic cell/elements.

2. Perfection/improvement of the procedure of the distribution of flow rates according to the forms of aviation.

3. Development of the procedure of the definition/determination of prime cost from the forms of air transportation (loads and the passengers).

4. Development of the procedure of the definition/determination of the prime cost of transportation from aircraft types (loads, the passengers, the given production).

5. Perfection/improvement of the methodology of the calculation/enumeration of the norms of depreciation allowance and planning flow rates on amortization in the enterprises of the civil aviation.

6. Study of the depending and conditionally not depending on the size/dimensions of movement flow rates of air transport.

7. Development of the methodology of the calculation, planning and standardization of airport flow rates.

8. Perfection/improvement of the methods of calculation/enumeration, planning and standardization of maintenance cost and technical maintenance.

9. Perfection/improvement of the methods of the calculation/enumeration of the prime cost of air transportation through the prime cost of flying hour.

10. Utilization of a method of the definition/determination of the prime cost of air transportation through the prime cost of the initial- final and moving operations in the practical activity of aircraft enterprizes for the perfection/improvement of profit and loss management and economic analysis of the results of work.

11. Development of the methodological questions of the analysis of the prime cost of air transportation and ways of its wider introduction into the practice of the work of the enterprises of air transport.

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12. Utilization computers for recording of current operations of operating costs, calculation and analysis of the prime cost of air transportation, for forecasting its level for five-year period and

the more distant prospect.

The independent problem whose decision makes it possible to improve all oblast'/areas of account, calculation/enumeration and forecasting the prime cost of air transportation, is the development of the economic and mathematical models of the formation of the operating costs of air transport.

In the nacno-investigation laboratory of RKIIGA under author's leadership and with his direct participation was investigated the large part of the questions pointed out above as independent problem, also, in connection with the definition/determination of the economically rational spheres of the application/use of an air transport. Below are set forth the basic results of studies in separate questions. A series of other questions will be elucidated in the appearances of the coworkers of laboratory.

§1. Increase in the role of the correct calculation/enumeration of the prime cost of air transportation under the new conditions of the management of the enterprises of the civil aviation.

Upon transition of the enterprises of the civil aviation to the

new conditions of planning and economic stimulation the prime cost of transport production is not forseen as the index, confirmed by the higher organization. However, this not that means that this index is related to the number secondary. On the contrary, its significance, on the strength of a number of circumstances, even more is raised, especially on air transport.

Synthesizing all the flowing expenditures cf enterprise on the production of production, prime cost it remains one of the main indices of the public costs of work, i.e., the level of the operational expenditures of air transport enterprises. Consequently, from it in many respects depends the size/dimension of the profit, which, as is known, is the difference between income and flow rates.

To enterprises it is given right itself to define objectively level of prime cost and to develop/process measures for its achievement.

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They are due also to be occupied by the scientific analysis of the reasons for the deviation of factual prime cost from the planned/planning, by the scientific basis of the ways of its lowering, attaining this level of prime cost, which during the

satisfaction of the requirements of national economy and population for transportation would provide the maximum of profit.

Consequently, the center of gravity of the correct definition/determination of the level of prime cost is moved directly to enterprises. This requires of the workers of the enterprises of strengthening scientific approach to the solution to the problems of prime cost and sharp increase in the economic knowledge of workers, in particular, the principles of the formation of production costs and factors, which objectively determine their level.

The importance of the index of the prime cost of air transportation is determined even by the fact that the transport, including air, is the particular branch of material production, which does not create new real product. Transport costs increase the cost of the production of commodities and the transport expenditures of population. The basic problem of all forms of transport is not obtaining the maximum of profit, but satisfaction of the requirements of national economy and population for transportation with the minimum of expenditures.

Therefore it is necessary to strengthen the monitoring of society of lowering the transport costs, after introducing for a transport as one of the basic indices the prime cost of

transportation (in addition to profit). All possible lowering the prime cost of air transportation must become the daily problem of each worker of Aeroflot.

However, it should be noted that in the enterprises of air transport still insufficiently is used this effective means of an increase in the profit as lowering the prime cost of air transportation and nontransport works, fulfilled by the civil aviation in national economy. More light/lung is the way, when an increase in the mass of profit is reached because of a decrease in the cost of fixed and especially return capital for aircraft enterprizes, selection of the most profitable air lines etc. But this time/temporary phenomenon.

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With the perfection/improvement of air transport production, decrease in the possible reserves of the liquidation of the large number of excessive return engines, spare parts, aggregates etc. of the further perfection/improvement of planning profit in profitableness, the liquidation of the reserves, placed into profitable sets, the perfection/improvements of system of charging (approach/approximation of their magnitude to socially necessary expense on weight shifting and passengers), with the optimization of

the distribution of aircraft according to air lines, etc it will become less than all possible economic liberties in the selection light/lung of the ways of an increase in the profit. The center of the attention of the workers of aircraft enterprizes will move for the questions of lowering the prime cost of air transportation. In our opinion, it is expedient to even now establish that the deductions into the funds of stimulation must be above from the profit, obtained because of lowering the prime cost, than from the profit, obtained because of other factors.

One must still much make in the oblast'/area of lowering the prime cost of transportation on air transport. At present the prime cost of air passenger transportation 3 times is higher than railroad and approximately 2 times higher than the prime cost bus. The proportion of the operating costs of the air transport of the country in the common/general/total flow rates of the single transport system of the USSR for passenger transportation 1.6 times is higher than the proportion of air transport in the passenger turnover of the country. The operating costs of air transport along absolute value compose significant sum. Decrease in these flow rates only for one percent gives economy to the country more than 10 million rubles.

§2. Ways of the perfection/improvement of the formation of structure

and composition of operating costs by the articles of calculation and economic cell/elements.

For determining and analysis of the prime cost of air transportation the operating costs in the civil aviation are dismembered on six articles of expenditures. Their proportion in the last/latter decade is given in Table 1.

In the accepted classification of the operating costs of air transport one should note four groups of the large deficiencies:

a) the nonconformity of the expenditures, included in the prime cost of air transportation, to the theoretical definition/determination of the prime cost of production;

b) the nonobservance of the principle of the distribution of flow rates according to the articles of calculation and economic cell/elements;

c) the grouping of expenditures does not make it possible to separate/liberate direct/straight flow rates on the basis of the objects of calculation (transport other forms of aviation, cargo and passenger transportation, etc);

d) the impossibility of the quantitative definition/determination of the effect of the basic factors on the level of the prime cost of air transportation (power of gruzo-passenger flow, aircraft type, the volume of transportation etc.).

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Let us examine the first group of deficiencies. As is known, transport production has a cost and a prime cost. The cost of transport production is composed of the cost of the consumed means for production and newly created cost in the process of transportation. In turn,, the cost of the consumed means for production it includes the transferred for transport production part of the cost of the fixed capital and the cost of consumed circulating capital.

Table 1. Structure of operating costs, o/o.

(A) № п/п.	(B) Статьи затрат	1958 г.	1963 г.	1968 г.
1.	АвиаГСМ	25,5	22,5	24,7
2.	Амортизация СМП	22,5	25,4	21,0
3.	Текущий ремонт СМП	3,9	5,0	5,6
4.	Заработная плата	34,0	29,2	29,1
	в том числе: (4a)			
	— зарплата ЛПС (4b)	—	—	15,1
	— зарплата работников ИАС (4c)	—	—	8,3
	— зарплата остального наземного состава (4d)	—	—	5,7
5.	Отчисления на социальное страхование	2,3	2,1	1,9
6.	Аэропортовые расходы	11,8	15,8	17,7
	(C) Итого	100	100	100

Key: (A). No in sequence. (B). Articles of expenditures. 1. AviaGSM [АвиаГСМ - aviation fuel and lubricants]. 2. Amortization SMP. 3. Routine repair SMP. 4. Wages. (4a). among other things. (4b). wage LPS. (4c). the wage of workers air technical service. (IAS). (4d.) the wage of remaining ground personnel. 5. Deductions for social insurance. 6. Airport flow rates. (C). Altogether.

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The newly created cost is composed of the cost of the necessary and additional product. The prime cost of transport production - this is part of the cost of production, which consists of the cost of the consumed means for production and cost of the necessary product, or in other words - this expressed in the money form of expenditure on consumed basic productive capital, working capital, and the remuneration of work of the workers of air transport. Referred to entire volume of the transport production, made for the determined/definite interval of time (month, quarter, year), these expenditures were called the name operating costs, referred to the unit of transport production - prime cost of air transportation.

From the aforesaid it is evident that in the prime cost of air transportation theoretically must not be included the cell/elements

of the cost of additional product. However, in practice, for the purpose of the reflection of all expenditures of enterprise on the production of production, connect in the prime cost of air transportation the flow rates of aircraft enterprizes on deductions for social insurance and until recently were included flow rates on the payment of percentages on the short term loans of State Bank for the addition/completion of circulating capital, which are part of the surplus product of our society. With the transition of enterprises to the new system of management the percentage on loans to Gosbank are not included in the prime cost of air transportation.

At present enterprises introduce pay/board for fixed capital and circulating capital. These flow rates are not included in the prime cost of air transportation from the moment/factor of their engendering. Are not included also in the prime cost of bonus to technical-engineering workers and by employee, pay out from the fund of material encouragment. At the same time of bonus by worker, pay out from this same fund, in prime cost are included. Deductions to social insurance from the sum of bonuses by worker, engineering and technical personnel and by employee, paid off from fund for material incentive, completely are included in the prime cost of air transportation.

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The absence of uniformity in the application/use of principles of the reference of different flow rates to the prime cost of air transportation clearly does not contribute tothe perfection/improvement of scientific leadership of the economy: is distorted the actual level of prime cost, is not created the correct presentation/concept of the economic laws governing its formation, is impeded the calculation/enumeration of the cost of transport production.

Does arise question, that it is better: to leave the procedure of the reference of expenditures on the prime cost of air transportation in that form as it there is now, or to give the practice of the calculation/enumeration of prime cost in conformity with its theoretical definition/determination?

In our view more correct alternate path. It is connected with strengthening the scientific approach to leadership of national economy, which must at present compose the basis of the economic activity of each enterprise.

If we adhere to the first path, then pay/bcard for funds, percentages on loans to State Bank, bonuses engineering and technical

personnel and the employees, paid out from fund for material incentive, also one should include in prime cost. Under these conditions it will show all expenditures, which will bear the enterprise for accomplishing a certain volume of transportation, i.e., the prime cost of production.

Under all conditions it is necessary to have the single principle of the reference of expenditures to prime cost - either in accordance with its theoretical definition, or to understand from as prime cost all expenditures, which will bear the transport enterprise during accomplishing transportation.

The second group of deficiencies let us explain in the following examples.

The given in Table 1 articles of the expenditures of "AviaGSM" and "amortization SMP" include respectively flow rates for fuels and lubricants only on aircraft and depreciation allowance on airframe and engine inventory (SMP). Flow rates for fuel/propellant and depreciation allowance on other objects show in airport flow rates. Consequently, with the formation of these articles is strictly observed the principle of the distribution of flow rates according to the articles of calculation.

In article "routine repair SMP" are included the flow rates only using spare parts, instruments, equipment and the materials, expended during routine repair and aircraft maintenance, and also all flow rates for these types of operation, if they are made not by aviation-engineering bases (ATB [ATB - air technical base]), but by aircraft maintenance enterprises.

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The flow rates of aviation-engineering bases in amortization and maintenance of industrial buildings, special motor transport, post-and-telegraph, office and wages of workers ATB into article "routine repair SMP" are not included. Wages of these workers shows in the article "wages", and the remaining flow rates - in the article "airport flow rates". Consequently, with the formation of article "routine repair" are observed neither principle of the distribution of flow rates according to the articles of calculation nor principle of the formation of expenditures according to economic cell/elements.

Article "wages" includes flow rates on the basic and supplementary wages of flight (LPS) and command-flight (KLS) compositions, workers of aviation-engineering bases, airports and administrations of the civil aviation, i.e., this article almost completely answers the principle of the formation of economic

cell/elements. But also here there is a disturbance/breakdown. Flow rates on the remuneration of work of workers VOKR do not enter in article "wages", but show in overhead of article "airport flow rates".

The article "airport flow rates" is complex and includes four groups of expenditures (A, B, C, D).

A. Industrial flow rates:

1. Maintenance and routine repair of airfields, buildings and buildings.

2. Exploitation of motor transport, special machines and tractors.

3. Flow rates on radio communication.

4. Other industrial flow rates.

B. Amortization of buildings, buildings and airport equipment.

C. The overhead:

1. Missions and displacement/movements.

2. Industrial safety measures.

3. Maintenance VOKhR.

4. Other overhead.

D. Unproductive flow rates.

Wages of the workers of airports here is nct included (besides wages of workers VOKhR). Consequently, in this article is observed to end not one principle of the formation cf the articles of calculation and economic cell/elements.

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Besides the nonobservance of uniformity in the application/use cf principles of the formation of the flow rates the articles of calculation one should also note many carelessness in the formation of separate groups and subgroups of the flow rates within article "airport flow rates". So, in group B. The "amortization of fixed capital" - there are no flow rates on the amortization of motor transport means, it is included in the subgroup of 2 groups A of

airport expenditures. There is no here also depreciation allowance on the equipment of the service of VOR.

In subgroup 1 group A are concentrated the flow rates on fuel/propellant and electric energy, but not all. Flow rates on the electric energy, consumed by the radio communication equipment and radio navigation, show in the subgroup of 3 groups A.

The subgroup of 4 groups A contains the large part of the expenditures, connected directly with the flight activity of airframe and engine inventory (free feeding LPS, payment to it diurnal, the transmission/delivery of free outfit, the feeding of the passengers aboard the aircraft and, etc), but it shows in airport flow rates.

The third group of deficiencies does not make it possible to determine direct/straight flow rates according to the objects of calculation, for example, for passenger and cargo transportation. A precisely, are not separate/liberated separately flow rates on the basis of catering passengers aboard the aircraft (besides feeding), the airport flow rates, connected only with passenger and cargo transportation [1].

FOOTNOTE [1]. In more detail see A. V. Miroshnikov. Determination of

operating costs from the forms of aviation and the forms of transportation. Riga, RKIIGA, 1970. ENDFOOTNOTE.

This is one of the reasons for the fact that on air transport, until now, is not determined in official acccuntability the prime cost of passenger transportation, although this form of transport in essence carries out passenger transportation.

For the purpose of the perfection/improvement of the estimation cf the prime cost of air transportation, knowledge of labor expense, energy content and material consumption of air transport as branches of national economy, ripened the need for regulating the separation of flow rates on the articles of calculatien and economic cell/elements. In our view the plausible solutien to question could be the schematic, shown in Table 2.

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The advantage of this circuit of the formation of structure and composition of the economic cell/elements of expenditures and articles of calculation is not only the fact that it makes it possible to remove almost all noted groups of deficiencies, but also its matrix form. The latter makes it possible successfully to apply computer to account for operating costs, estimation of the prime cost of air transportation and even for its analysis.

§3. Economic and mathematical models of the formation of operating costs and sphere of their utilization.

The studies showed that one of the basic ways of the perfection/improvement of the methods of the calculation/enumeration of the prime cost of air transportation is the development of the economic and mathematical models of the formation of operational flow rates for the articles of expenditures. The modelling of the process of the formation of the operating costs of air transport makes it possible to solve the problems of the correct

definition/determination of the prime cost of air transportation at all stages: during the technical and economical searches of air traffic and the designing of aircraft in the period of the exploitation of flight vehicles, during standardization and analysis of flow rates. Models make it possible to solve a series of the theoretical questions: to obtain the equations of the dependence of the prime cost of air transportation on the size/dimensions of movement, distance of the transportation and other factors, which is very important for purposes of practice. One of the courses of the practical realization of the potential possibilities of the models of the formation of operating costs is their utilization for determining the scientifically sound profitable sets from the operations of transport process. This can improve profit and loss management on air transport.

Actually, not departing from the truth, it is possible to confirm that model - these are the universal economic and mathematical instrument putting to use by which it is possible to penetrate all cell/elements of the prime cost of air transportation and to correctly solve all problems of its calculation/enumeration, analysis, account and even forecastings.

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Table 2. The matrix circuit of the formation of the operating costs of air transport along the articles of calculation and economic cell/elements.

(1) Экономические элементы	(4) Статьи калькуляции								
	(2) Самолето-моторный парк	(3) Текущий ремонт самолето-моторного парка	(5) Аэропортовые расходы					(12) Расходы по управлению	(13) Итого
			(6) Всего	(7) В том числе: (8) служба перевозок	(9) служба движения и связи	(10) автохозяйство	(11) служба ГСМ		
	I	II	III	III А	III Б	III В	III Г	IV	
1	2	3	4	5	6	7	8	9	10
А. Заработная плата, в том числе: — повременная, — сдельная (14)	1. Заработная плата ЛПС, в т. ч.: а) повременная, б) сдельная по транспортной авиации, в) сдельная по ПАНХ, г) повременная и сдельная бортпроводников (15)	1. Заработная плата работников ИАС, в том числе: а) производственного персонала (16)	1. Заработная плата остального наземного состава, в том числе: а) зарплата наземных партий по воздушным съемкам (17)	1. Зарплата по службе, в том числе: а) пассажирские перевозки, б) грузовые перевозки (18)	Зарплата по службе (19)	Зарплата по службе (19)	Зарплата по службе (19)	Заработная плата работников управления ГА, в том числе: а) заработная плата работников агентства (20)	
Б (B). Амортизация (21)	1. Амортизация самолето-моторного парка, в том числе: а) транспортная авиация б) ПАНХ (22)	1. Амортизация зданий, сооружений и оборудования для производства текущего ремонта и обслуживания (23)	1. Амортизация зданий, сооружений и оборудования аэропортов (исключая АТБ) (24)	1. По службе, в том числе: а) пасс. перев., б) груз. перев. (25)	1. По службе (26)	1. По службе, в том числе: а) пасс. перев., б) груз. перев. (27)	1. По службе (28)	1. Амортизация зданий и оборудования управления ГА, в том числе: а) амортизация по зданиям агентства (29)	
В (C). Топливо и электроэнергия, в т. ч.: — электроэнергия (30)	1. АвиаГСМ, в том числе: а) транспортная авиация б) ПАНХ (31)	1. Топливо для обогрева рабочих мест в пассажирских кабин, для подогрева двигателей перед запуском. 2. Расходы электроэнергии для нужд текущего ремонта (32)	1. Топливо для нужд аэропорта. 2. Электроэнергия для нужд аэропорта (силовая и осветительная) (33)	1. По службе 2. По службе, в том числе: топливо и электроэнергия а) пассажирские перевозки б) грузовые (34)	1. По службе 2. По службе (35)	1. По службе, в том числе: а) пасс. перев., б) груз. перев. 2. По службе, в том числе: топливо и электроэнергия: а) пасс. перев., б) груз. перев. (36)	1. По службе 2. По службе (37)	1. Топливо для обогрева зданий управления. 2. Электроэнергия для нужд управления ГА, в том числе: а) топливо и электроэнергия для нужд агентства (38)	
Г (D). Материалы (39)	1. Стоимость спирта, полетных карт, бланков полетной документации, зарядки огнетушителей (на самолетах). 2. Стоимость фотоматериалов для воздушных съемок и других материалов для нетранспортных работ гражданской авиации (40)	1. Запчасти, приборы и оборудование, расходуемые при текущем ремонте и техническом обслуживании СМП. 2. Стоимость ремонта запасных частей, агрегатов и спецоборудования. 3. Стоимость материалов, расходуемых для нужд ремонта и консервации самолетов и двигателей, для стирки и дезинфекции бытового оборудования пасс. кабин, для содержания в чистоте зданий и сооруж. АТБ (ветошь, керосин, веники, матер. для натирки полов, очистки окон и т. д.). 4. Износ малоценного и быстро изнашивающегося инвентаря, относящегося к текущему ремонту и техническому обслуживанию (41)	1. Всевозможные материалы, расходуемые аэропортом для обслуживания пассажиров и самолетов, для обеспечения работы аэропортовых механизмов, машин, для содержания в чистоте зданий и сооружений аэропорта (ветошь, веники, метлы, материалы для натирки полов, очистки огон и т. д.). 2. Износ малоценного и быстро изнашивающегося инвентаря аэропорта (исключая АТБ). 3. Стоимость ракет и материалов по рассеиванию туманов (42)	По службе в том числе 1 и 2: а) пассаж. перевозки, б) грузовые перевозки (43)	1. По службе (44)	1. По службе (44)	1. По службе (44)	1. Материалы, расходуемые для нужд управления ГА. 2. Износ малоценного и быстро изнашивающегося инвентаря управления ГА, в том числе: а) материалы и износ малоценного и быстро изнашивающегося инвентаря по агентству (45)	
Д (E). Прочие (46)	1. Бесплатное питание ЛПС. 2. Суточные и экспедиционные ЛПС. 3. Страхование ЛПС. 4. Стоимость форменного обмундирования, выдаваемого бесплатно и со скидкой 5%. 5. Бесплатное питание пассажиров и конфеты. 6. Стоимость бортовых библиотечек, газет, журналов, шахмат и т. д., приобретаемых для обслуживания пассажиров. 7. Стоимость медикаментов, бортаптечек и гигиенических пакетов. 8. Комис. вознагражд. объединению «Интурист» и др. уполномоченным за реализацию билетов. 9. Стоимость бланков пассажир. билетов и перевозочной документации (47)	1. Текущий ремонт зданий, сооружений и оборудования АТБ. 2. Оплата текущего ремонта СМП, выполняемого АРЗ. 3. Водоснабжение и канализация. 4. Охрана труда. 5. Расходы по рационализации, изобретательству, на техническую учебу и все другие затраты по текущему ремонту СМП (48)	1. Текущий ремонт зданий и сооружений аэропорта. 2. Водоснабжение, канализация. 3. Текущий ремонт аэродромного оборудования и механизмов. 4. Расходы по озеленению и оформлению отвода земельных участков. 5. Расходы по обеспечению ночлегом пассажиров и прилетающий экипажей. 6. Командировки и перемещения. 7. Охрана труда. 8. Содержание ВОХР. 9. Прочие накладные расходы. 10. Расходы по рекламе, в том числе: а) пассажир. перевозки, б) грузовые перевозки. 11. Расходы по тренировке (за исключением зарплаты, амортизации, авиаГСМ и текущего ремонта) (49)	По службе По службе (43) — — — — — — в том числе 1 и 2: а) пасс. перев., б) груз. перев.	По службе По службе — — — — — — — (44)	По службе По службе — — — — — — — (44)	По службе По службе — — — — — — — (44)	1. Текущий ремонт зданий управления ГА. 2. Водоснабжение и канализация. 3. Командировки и перемещения. 4. Прочие накладные расходы. 5. В том числе: а) расходы 1, 2, 3, 4 по агентству. (50)	
Е (F). Всего расходов (51)									

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Key: (1). Economic cell/elements. (2). airframe and engine inventory. (3). Routine repair of airframe and engine inventory. (4). Articles of calculation. (5). Airport flow rates. (6). In all. (7). Among other things. (8). the service of transportation. (9). the service of movement and bond/connection. (10). motor transport establishment. (11). fuels and lubricants service. (12). Flow rates on administration. (13). Altogether. (14). A. Wages, including: - periodic, piece-work; (15). 1. Wages LPS, including: a) is periodic, b) piece-work on cargo fleet, c) piece-work on PANX, d) periodic and piece-work the stewards; (16). 1. Wages of workers air technical service, including: a) industrial personnel; (17). 1. Wages of remaining terrestrial composition, including: a) the wage of the ground-based parties on aerial surveys; (18). 1. Wage on service, including: a) passenger transportation, b) cargo transportation; ~~service;~~ (19). wage on service; (20). wages of the workers of administration GA [ГА - Civil Aviation], including: a) wages of the workers of agency. (21). B. Amortization; (22). 1. Amortization of airframe and engine inventory, including: a) cargo fleet, b) PANX; (23). 1. Amortization of buildings, buildings and equipment for the production of routine repair and maintenance; (24). 1. Amortization of buildings, buildings and equipment of airports (eliminating ATB); (25). 1. On service, including: a) pass. trans., b) the load. trans; (26). 1. On service; (27). 1. On service, including: a) pass. trans., b) the load trans; (28). 1. On service; (29). 1. Amortization of buildings and equipment of administration GA,

including: a) amortization on buildings agency. (30). C. Fuel/propellant and electric energy, including: - electric energy; (31). 1. AviaGSM, including: a) cargo fleet, b) PANX; (32). 1. Fuel/propellant for the heating of work sites and passenger compartments, for the preheating of the engines before starting/launching. 2. Flow rates of electric energy for the needs of routine repair; (33). 1. Fuel/propellant for the needs of airport. 2. Electric energy for the needs of airport (power and illuminating); (34). 1. On service. 2. On service, including: fuel/propellant and electric energy, a) passenger transportation, b) cargo; (35). 1. On service. 2. On service; (36). 1. On service, including: a) pass. trans., b) the load trans. 2. On service, including: fuel/propellant and the electric energy: a) pass. trans., b) the load trans. (37). 1. On service. 2. On service; (38). 1. Fuel/propellant for the heating of the buildings of administration. 2. Electric energy for the needs of administration GA, including: a) fuel/propellant and electric energy for the needs of agency. (39). D. Materials; (40). 1. Cost of alcohol, flight cartlotsiya, forms of flight documentation, charging of fire extinguishers (on aircraft). 2. Cost of photographic materials for aerial surveys and other materials for nontransport works of the civil aviation; (41). 1. Spare parts, instruments and equipment, used during routine repair and maintenance of SMP. 2. Cost of the repair of spares, aggregates and special equipment. 3. Cost of the materials, expended for the needs of repair and conservation of aircraft and engines, for laundry and disinfection of standard

equipment the pass. of cabin/compartments, for a maintenance in the cleanliness of buildings and structures. ATB (rag, kerosene, besoms, mater. for rubbing weeding, driving/clearing windows and, etc). 4. Wear of the low value and rapidly being worn inventory, which relates to routine repair and maintenance; (42). 1. All possible materials, expended by airport for the maintenance of the passengers and aircraft, for operational provisions of airport mechanisms, machines, for a maintenance in the cleanliness of buildings and buildings of airport (rag, besoms, comet tails, materials fcr rubbing weeding, driving/clearing windows and, etc). 2. Wear of the low value and rapidly being worn inventory of airport (eliminating ATB). 3. Cost of rockets and materials on fog dispersion; (43). on service, including 1 and 2: a) the passage. of transportation, b) cargo transportation; (44). 1. On service; ~~1. On service, 2. On service;~~ (45). 1. Materials, expended for the needs of administration GA. 2. Wear of the low value and rapidly being worn inventory of administration GA, including: a) the materials and the wear of the low value and rapidly being worn inventory on agency. (46). E. Other; (47). 1. Free feeding LPS. 2. Diurnal and expeditionary LPS. 3. Insurance LPS. 4. Cost of the regular/prescribed outfit, overhung free of charge and with discount 5o/o. 5. Free feeding of the passengers and candy. 6. Cost of chafer libraries, newspapers, journal, chess and, etc, acquired for maintenance passengers. 7. Cost of medicaments, on board first-aid kits and hygienic piles. 8. Commission awarded to to

unification/association "Intourist", etc. authorized for the realization of tickets. 9. Cost of the forms the passenger. of tickets and transporting documentation; (48). 1. Flowing repair of buildings, buildings and equipment ATB. 2. Payment of routine repair of SMP, fulfilled ARZ. 3. Water supply and sewerage. 4. Industrial safety measures. 5. Flow rates on rationalization, invention, for the technical training and all other expenditures on routine repair of SMP; (49). 1. Routine repair of buildings and buildings of airport. 2. Water supply, sewerage. 3. Routine repair of airport equipment and mechanisms. 4. Flow rates on re-planting and formulation of the offtake of earth sections. 5. Flow rates with respect to the safeguard with the lodging for the night of the passengers and arriving flying crews. 6. Missions and displacement/movements. 7. Industrial safety measures. 8. Maintenance VOXR. 9. Other overhead. 10. Flow rates on advertisement, including: a) the passenger. of transportation, b) cargo transportation. 11. Flow rates on training/aging (with the exception of wage, amortization, AviaGSM and routine repair);

(50). 1. Routine repair of the buildings of administration GA. 2. Water supply and sewerage. 3. Missions and displacement/movements. 4. Other overhead. 5. Among other things: a) flow rates 1, 2, 3, 4 on agency. (51). F. In all flow rates.

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This universality of the models of the formation of operating costs is explained objectively being inherent in them by the unique characteristics:

a) models make it possible to catch the effect of all basic factors on the level of prime cost (both entire aggregate of factors and each irdividually);

b) they make it possible to quantitatively estimate the effect of each factor, that especially importantly under conditions of the new system of planning and economic stimulation;

c) make it possible to apply computer to account for operating costs, calculation and analysis of the prime cost of air transportation, forecasting its magnitude.

Table 3 gives the micromodels of the formation of watch operating costs according to the articles of expenditures and the common/general/total equation of the prime cost flight is frequent.

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Table 3. Models of the formation of watch operating costs according to the articles of expenditures.

(A) Статьи затрат	(B) Модели формирования часовых эксплуатационных расходов
1	2
1. Заработная плата ЛПС с отчислениями на социальное страхование	$\Theta_{зп} = \left(\frac{D}{t_{эк}} + e V_р\right) K_{зп};$ $D = \left(\sum_{i=1}^{n} D_i^{эк} K_i^{кл} + D^{би} H \sigma\right) K_{баз} \cdot K_{пр};$ $e = 0{,}01\, e_к \tau \left(\sum_{i=1}^{n} \varphi_i + 0{,}177 H\right);$ $K_{зп} = K_{доп} \cdot K_{клс} \cdot K_{нач}.$
2. Амортизация СМП	$\Theta_{ам} = \Theta_{ам}' + \Theta_{ам}'' \cdot m \left(1 + 0{,}2 \frac{\omega_{нз} \cdot V_р}{L_{бп}}\right).$
3. АвиаГСМ	$\Theta_{топ} = \left\{ \frac{[\omega_{нз} Q_{нз} + \Delta t (Q_{\Delta t} - Q_{кр})] V_р}{L_{бп}} + \right.$ $\left. + Q_{кр} \right\} C_{топ} \cdot K_{баз}^{топ} \cdot K_l.$
4. Текущий ремонт	$\Theta_{то} = \vartheta_{то} \cdot n_{то};$ $\Theta_{то} = M_{то} + T f K_{баз} \cdot K_{зп}^{то} + \frac{\Sigma \Theta_{то}^{нез} \cdot \mu_{то}^{нез}}{R};$ $n_{то} = n_{то}^{пер} + \bar{n}_{то}^{опер} \frac{V_р}{L_{бп}}.$
5. Прочие летные расходы	$\Theta_{проч} = (\Theta_{зп} + \Theta_{ам} + \Theta_{топ} + \Theta_{то})\, \varepsilon.$

Table 3. (continued)

1	2
6. Аэропортовые расходы	$\Theta_{ап} = \Theta_{с-в} \frac{V_р}{L_{бп}}$; $\Theta_{с-в} = \left(\bar{\vartheta}_{Go} + \frac{\Sigma \Theta_{Go}^{const}}{\Sigma N_l K_{пр}^{i}}\right) K_l + + \left(\vartheta_{Gк} + \frac{\Sigma \Theta_{Gк}^{const}}{\Sigma O_{отпр}^{прив}}\right) \gamma_l \cdot G_{кl}^{прив}$.
7. Себестоимость летного часа	$\Theta = \Theta_\alpha + \Theta_\beta$; $\Theta_\beta = (1+\varepsilon)\left(\frac{D}{t_{эк}} K_{зп}^{лпс} + \Theta_{ам}' + \Theta_{ам}'' m + + Q_{кр} \cdot \bar{C}_{топ} + n_{то}^{пер} \vartheta_{то}^{зав}\right)$; $\Theta_\alpha = (1+\varepsilon)\left\{e V_р K_{зп}^{лпс} + 0{,}2 \Theta_{ам}'' m \omega_{нз} \cdot \frac{V_р}{L_{бп}} + + C_{топ}[\omega_{нз} Q_{нз} + \Delta t (Q_{\Delta t} - Q_{кр})] \cdot \frac{V_р}{L_{бп}} + + n_{то}^{пер} \frac{\Sigma \Theta_{то}^{нез} \mu_{то}^{нез}}{R} + + \bar{n}_{то}^{опер} \frac{V_р}{L_{бп}} \cdot \left(\vartheta_{то}^{зав} - \frac{\Sigma \Theta_{то}^{нез} \mu_{то}^{нез}}{R}\right)\right\} + + \Theta_{с-в} \frac{V_р}{L_{бп}}$; $\vartheta_{то}^{зав} = M_{то} + T f K_{баз} K_{зп}^{то}$.

Key: (A). Articles of expenditures. (B). Models of the formation of watch operating costs. 1. Earned pay/board LPS with deductions for social insurance. 2. Amortization SMP. 3. AviaGSM. 4. Routine repair. 5. Other flight flow rates. 6. Airport flow rates. 7. Prime cost of flying hour.

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In Table 3 are accepted the following designations:

$Э_{зп}$ flow rates on the wage of LPS, rubles/airplane-hour;

D - part of the basic wage of LPS, which depends on the level of the salary rates, amount of crew members, the appropriated by it class status, the Rayon of the basing of subdivision and magnitude of bonuses for the execution of the plan with respect to in flight for hours, rub/samoleto-month;

$t_{эк}$ monthly time in the air to crew;

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e is part of the basic wages of LPS, which depends on the level of kilometer sets, the amount of crew members, exudation of kilometers, category of the difficulty of line, operating time of aircraft (by day, at night), of rub/samolto-km.;

$V_р$ voyaging speed, km/h;

$K_{доп}$ coefficient, that considers supplementary wages LPS (for the time of temperings, compensation for the unpaid tempering, etc);

$K_{нач}$ the coefficient of deductions for social insurance, equal for aviation transport 1067;

$K_{клс}$ the coefficient, which considers the wage of command-flight composition;

$D_i^{3к}$ the salary rate of the i crew member of the third class (besides the stewards) for the Rayon of the basing of of subdivision, where there are no zonal additional payments;

$K_i^{кл}$ the coefficient of additional payment for class status to the i crew member (besides the stewards);

$D^{бп}$ the salary rate of one steward for the Rayon of the basing of subdivision, where there are no zonal additional payments;

n - the amount of crew members without the stewards, varying within limits of i = 1, 2, ..., n;

H - the amount of the stewards in the composition of crew;

σ is the coefficient, which considers the reduced size/dimension of the bonus of the stewards for the fulfilment of the plan with respect to in flight for hours in comparison with remaining crew

members;

$K_{баз}$ the coefficient, which considers an increase in the salary rates depending on the Rayon of the basing of subdivision; vary within the range of 1.0 to 2.0;

$K_{пр}$ the coefficient of bonuses to crew members (besides the stewards) for the fulfilment of the plan with respect to in flight for hours;

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$e_к$ set of per/kilometer payment of the craft commander, which is changed depending on the category of the difficulty of line, kopecks/ton-kilometer;

$\mp_i$ the coefficient, which considers a decrease in the sets of per/kilometer payment of other crew members in comparison with the craft commander (except the stewards);

τ is the coefficient, which considers a change per/kilometer set in time dependence of flight (by day, at night);

0.177 - the magnitude, which shows in which relationship/ratio

with $e_к$ are located per/kilometer sets of the stewards, and also the size/dimension of additional payment to the stewards during flights in night time in comparison with additicnal payment to other crew members;

$Э_{ам}$ the flow rates on amortizaticn as a whole on aircraft, rub/samoleto-hour;

$Э_{ам}'$ the norm of depreciation allowance cn glider/airframe with equipment, rub/samcleto-hour;

$Э_{ам}''$ the norm of depreciation allowance cn engine, rub/samoleto-hour;

m - the amount of engines on aircraft;

$ω_{нз}$ the operating time of engine on the earth/ground for 1 voyage, hours/voyage;

$L_{бп}$ the distance of nonstop flight, km.;

$Э_{топ}$ flow rates on AviaGSM, rub/samoleto-hour;

$Q_{нз}$ the consumption of fuel in the engine operation on the

earth/ground, t/samoleta-hour;

$C_{топ}$ the wholesale price of the ton of fuel/propellant for the Rayon of the basing, accepted as initial, rubles/t;

$K_{баз}^{топ}$ the coefficient, which considers a change of the wholesale price of fuel/propellant depending on the Rayon of the basing of airport;

K_l the coefficient, which considers an increase in the flow rates for fuel/propellant depending on the removal of airport on railway station, marine or river port, and also because of expenditures in fuel dumping, to its storage and natural loss/depreciation;

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Δt - the time of takeoff, collection of height/altitude, lowering, landing and maneuvering in the airport zone, hours/voyage;

$Q_{\Delta t}$ hourly mean the fuel consumption for time Δt, t/airplane-hour;

$Q_{кр}$ hourly mean the fuel consumption after to the time of

cruise flight, t/airplane-hour;

$Э_{то}$ the prime cost of given one of maintenance, rubles/given unit;

$n_{то}$ the amount of given ones of maintenance, which are necessary for flying hour;

$\Sigma Э_{то}^{нез}$ provisionally constant flow rates ATB, rubles/year;

R - the volume of work ATB, reduced units/year;

$M_{то}$ the norm of material expenditures on maintenance, rubles/reduced units; it can be differentiated with respect to aircraft types, the forms of maintenance and the Rayons of basing ATB;

T - the labor expense of one given unit, hrows-casov/prived. of u.;

f - the average tariff rate, which corresponds to the average discharge of works for the Rayon of basing ATB, accepted for initial, rubles/man-hour;

$K_{баз}$ the coefficient, which considers a change of the tariff rates depending on the Rayon of basing ATB;

$K_{зп}^{то}$ the coefficient, which considers prizes for execution and overfulfillment of norms, additional payment for work into night time and foremanship, supplementary wage and deductions for social insurance;

$K_{то}^{неа}$ the coefficient, which considers change conditionally not depending on the volume of work of the flow rates ATB on the territorial Rayons of their basing;

$n_{то}^{пер}$ the amount of given ones of maintenance, which are necessary for flying hour, on the periodic forms of maintenance and power-plant replacement for operating time of their in air;

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$\overline{n}_{то}^{опер}$ the amount of given ones of maintenance for voyage on the operational forms of maintenance and power-plant replacement for the time of their work on the earth/grcund;

$Э_{ап}$ airport flow rates, rub/samoleto-hour;

$э_{Go}$ the set of the specific airport expenditures, which depend on the amount of aircraft departures, rubles/reduced aircraft departure;

$\Sigma э_{Go}^{const}$ the subgroup of the airport expenditures, connected with the maintenance of aircraft departures, which remains constant with a change in the amount of aircraft-flights for the airport of this class, rubles/airport-year;

$э_{Gk}$ the set of the specific airport expenditures, which depend on the volume of shipments, rubles/ the ton of shipments;

$\Sigma э_{Gk}^{const}$ the subgroup of the airport expenditures, connected with the volume of shipments, which remains constant during a change in the volume of shipments in the airport of this class, rub/aeroport-year; it is differentiated with respect to the classes of airports;

$\Sigma O_{отпр}^{прив}$ the annual volume of shipments in the given tons; the reduction of passenger and cargo shipments is produced proportional to expenditures on the maintenance of passenger with baggage and the tons of load;

$\Sigma N_{прив}$ the amount of led aircraft departures per annum, equal

to $\Sigma N_{\text{прив}} = \Sigma N^i K_N^i$:

K_N^i the scaling factor of the real aircraft-flights into those which were given in i type aircraft;

G_{ki}, γ_i commercial load and the percentage of its utilization in this type of airplane, tons;

ε coefficient, that considers other flight flow rates;

$\Theta_{ro}^{зав}$ the flow rates per given unit, which are not changed depending on the volume of work ATB, rubles/adjusted units.;

$\Theta_в$ the flow rates for flying hour, which are not changed depending on the distance of nonstop flight;

$\Theta_л$ the flow rates for flying hour, which are changed depending on the distance of nonstop flight.

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We will not be unfounded let us show the multifeature possibilities of the developed models of the formation of operating costs in a number of examples.

So, the model of the formation of flow rates on wages of LPS makes it possible to consider the effect of 10 basic factors, which determine the level of hourly consumptions according to this article: the aircraft type, the distance of nonstop flight, the amount of crew members and its composition, appropriated to crew members class status, the voyaging speed, the Rayon of the basing of enterprise and the Rayon of the passage of line, flight time in the cut/section of days (by day, at night), the size/dimension of bonuses to crews for the execution of the plan with respect to in flight for hours, the magnitude of supplementary wages. In this case as showed the practice, one ought not to fear the apparent complexity of the account of the effect of the indicated factors. When it is not necessary to separately consider the effect of each factor, their reaction it is incorporated, as a result of which simultaneously is reached large simplicity of the calculations and required accuracy.

The model of the formation of flow rates on wages makes it possible also to forecast the level of these expenditures for the different types of long-range flight vehicles, being strictly based on the laws governing the development of process, but not on irregular dependences. For example, in the work of A. A. Badyagin, Ye. A. Ovrutskogo (designing of passenger aircraft taking into

account the economy of explcitation. M., the "machine-building", 1964) the level of wages of LPS is determined by means of the search of the dependence between the hourly ccnsumptions on wages and the amcunt of passenger places on aircraft (!). We not against the utilization of correlative methods, we for all possible wide application of all worthwhile mathematical methcds, but with the compulsory/necessary account of the logic of process. Indeed correlation can be found even between the level of wages of LPS and the amount it washed, consumed by the passengers, drunk by the passengers beverages, etc.

Putting to use the model of the formation of flow rates on wage, it is easy to forecast flow rates by means of the concrete account of the dynamics of the basic factors. Thus, for instance, for supersonic aircraft unconditionally decreases the sanitary norm of time in the air by crew and, possibly, will be equal to 20-30 hours in month depending on Mach number (with sufficient accuracy this magnitude can be determined on the basis of the available medical studies).

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Crew will be completed from the specialists only of I class with setting by it the increased salary rates (for example, to 30o/o). After substituting these values and formulas, we we will obtain the

possible (but not hypothetical) rate of discharge from wages of LPS at the consciously accepted initial conditions. This method widely is used in the practice of the diploma designing of the students of the Riga red banner institute of the engineers of the civil aviation.

The models of the formation of operating costs according to articles of expenditures make it possible to improve the procedure of the distribution of flow rates according to the forms of aviation, the forms of transportation and aircraft types, since they make it possible to separate/liberate flow rates on the basis of the separate groups of workers (wages) and aircraft types (maintenance, the airport flow rates), which in the acting static accountability are not differentiated.

The development of the models of the formation of operating costs made it possible to reveal/detect a series of unknowns up to now of the dependences of flow rates on the technical and economical indices of work of air transport, and also quantitatively to evaluate known dependences.

The models of the formation of operating costs considerably simplify the method of the definition/determination of the economically rational spheres of the utilization of different aircraft types, and also of the spheres of the application/use air

and of other forms of transport. So, using together models of operating costs, the capital investments and the cost evaluation of speed, it was possible to obtain the equaticns cf the boundary curves, which demarcate the spheres of the utilization of different forms of transport and immediately they show at which distance, the power of gruzo-passenger flow etc. expedient to use the compared forms of transport [1].

FOOTNOTE [1]. With the procedure of obtaining and the methods of the utilization of boundary curves it is possible tc be acquainted in the work: Miroshnikov A. V. To the economic theory cf cooperation in the field of transportation. Transactions of RKIIGA. Issue 54. Riga, 1966. ENDFOOTNOTE.

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The given in Table 3 models of the formatien of operating costs make it possible not only to create the fundamentally new methods of calculation of the prime cost of air transportation (for example, through the prime cost of the initial-final and moving operations), but also substantial to improve the acting methods. For example, the method of the definition of the prime cost of air transportation

through the prime cost of flying hour, which obtained on the strength of its simplicity the widest acceptance on air transport, suffers the number of the large deficiencies, main from which is the impossibility of the accurate account of effect on the prime cost of air transportation of such important factors as flying range and the power of passenger flow. With the aid of the modelling of the process of the formation of operating costs the deficiencies pointed out above easily are eliminated by the liberation/isolation of that part of the prime cost of flying hour, which is changed with an increase or decrease in the distance of nonstop flight, power of gruzo-passenger flow. In this case the calculation is conducted according to the same, as before, prejde to the simple formula

$$S_{\text{ткм}}^{\text{пр}} = \frac{100\,(\Theta_\alpha + \Theta_\beta)}{A}$$ kopeck/adjusted thous. km,

where A is productivity of work of aircraft, t-km/h; Θ_α, Θ_β part of the prime cost of flying hour, which with respect remains invariable and is changed with an increase or decrease in the distance of nonstop flight, rub/samoleto-hour.

The accuracy of the calculation of the prime cost of air transportation considerably is increased.

§4. Perfection/improvement of the methodology of the distribution of operating costs according to the forms of aviation (forms of activity).

To 1967 the operating costs in the forms of aviation were distributed as follows.

The flow rates from AviaGSM and amortization of SMP were determined from the forms of aviation by direct/straight count, but expenditures on routine repair SMP were distributed proportional to depreciation allowance. The wage of entire composition was related by the forms of aviation proportional to amortization and to routine repair, but airport flow rates - it is proportional 3 articles of flow rates (AviaGSM, amortization and routine repair).

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The main disadvantage in this procedure was the fact that the method of the distribution of expenditures on routine repair led frequently to a sharp increase in the expenditures on maintenance due to PANKh, as a result of which unjustified was overstated the prime cost of one given hour on PANKh.

From January 1967 procedure was changed in part of the principle of the distribution of expenditure/consumptions according to wage and of airport expenditure/consumptions, also was establish/installed the limitation of the sum of expenditure/consumptions on routine repair of the SMP, which could be related by PANKh (it should not have exceed 50o/o of depreciation allowance PANKh). According to this procedure, which acts and at the present time, from common/general/total expenditure/consumptions on the basis of wages are separate/liberated the expenditure/consumptions on the basis of wages of the LPS, piece-work part of which is distributed in the forms of aviation by direct/straight count, and periodic - is proportional to the piece-work part of the wage of LPS. Furthermore, from common/general/total flow rates on the basis of wage is separate/liberated the wage of the ground-based parties on the basis

of aerial surveys, and it completely is related by PANX. The remaining flow rates on wage [1] and airport flow rates are distributed proportional to the sums of 4 articles of expenditures.

FOOTNOTE Here and subsequently, when the discussion concerns wage, then it is thought that it is accepted together with deductions for social insurance. ENDFOCTNOTE.

The acting procedure is indisputably the steep pitch forward in comparison with the procedure, which was being adopt/employed until 1 January 1967. However, it preserved another the number of essential deficiencies.

Main of them is the fact that in the acting procedure is not observed the completely fundamental rule of the distribution of the flow rates: the distribution of the articles of operating costs according to the forms of aviation must be produced proportional to that sign, which first of all mainly determines the actual magnitude of these expenditures.

From these positions ideal it would be to plan/glide and to consider all articles of flow rates separately in the forms of

aviation. However, at present this thus far very difficult problem is solved it only for depreciation allowance and flow rates on AviaGSM [авиаГСМ aviation fuel and lubricants]. Therefcre output/yield in this stage is the definition/determination of the main signs, which influence the formation of the magnitude of the remaining articles of expenditures.

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On the basis of the conducted investigations it is suggested to change the principle of the distribution of flow rates according to two articles of the flow rates: "routine repair SMP" and "time wage LPS" (with deductions for social insurance), but subsequently article "airport flow rates".

The studies showed that for the distributicn of complete maintenance cost is more suitable this index as volume of the works of maintenance in given unity, and not the sum of the flow rates on the amortization of SMP. In this case the flow rates on wages of workers air technical service [АТБ] and general production flow rates ATB [АТБ - air technical base] are distributed almost accurately. Flow rates for materials and spare parts (shown in the article "routine repair SMP") more tightly are correlated not with the sum of depreciation allowance, but with the volume of works of the given

units. As a whole the complete maintenance cost are distributed more accurately, if we adopt/employ as index for the distribution of flow rate not the sum of depreciation allowance, but the volume of works on maintenance.

Furthermore, in this case is improved the distribution of the wage of ground personnel and airport flow rates, since of the wage of ground personnel is deducted the wage of workers air technical service, of the airport - general output expenses ATB are distributed they more accurately.

In the presence of the norms of the flow rate of materials and spare parts for flying hour flow rates on article "routine repair" (without wage air technical service and total production ATB) can be prorated to standard sums.

The specifications of the acting procedure pointed out above do not require supplementary statistical accountability. The wage of workers air technical service and general output expenses ATB show in official statistical accountability. The volume of works on maintenance on the forms of aviation can be obtained from statistical materials ATB or calculated from the norms of the amount of given ones for flying hour.

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For the number of the enterprises of the civil aviation the calculations conducted showed that during the distribution of maintenance cost according to the acting procedure is obtained the following picture:

a) sharply is distorted rate of discharge for routine repair, related by the aviation of special application. So, for the aircraft enterprizes, where the proportion of the volume of works on the maintenance of the nontransport works of aviation (PANKh) composes 16-18o/o of the total volume of works ATB, and depreciation allowance - 3-5o/o of their common/general/total sum, flow rates on routine repair of aircraft PANKh are understated 3.5-4 times in comparison with their actual magnitude. The understating of flow rates is observed on other enterprises, although to different degree depending on proportion of depreciation allowance on PANKh and the volume of works on aircraft maintenance PANKh;

b) is understated also the sum of airport flow rates and flow rates on wage for 14-18o/o (for the enterprises pointed out above);

c) as a whole the flow rates, related for the aviation of special application, as a rule, they are understated because of the

overestimate of expenditures on cargo fleet. For example, for the enterprises pointed out above the understating of common/general/total flow rates on PANH is 18o/c.

The distribution of the time wage of LPS more accurately to produce is proportional to its norms for flying hour, but not to the sum of the piece-work part of wages. The calculations show that in this case the time wage is distributed almost so accurately, as if we it determined by direct/straight count.

The remaining part of the article the airport flow rates (after the subtraction of them of general output expenses ATB) and the wage of ground personnel (after the subtraction from it of the wage of the workers ATB and of the ground-based parties on aerial surveys) are invoices with respect to the sum of all remaining expenditures, and it is possible to distribute them proportional to the sum of four articles of flow rates (AviaGSM; amortization SMP; routine repair SMP, by including here entire complex of expenditures; wage LPS after an improvement in the distribution of time wage).

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Subsequently the distribution of this group of the flow rates, which let us name "airport flow rates", by understanding by this

entire complex of airports with respect to the safeguard for a flight and commercial activity, also it is possible to improve:

a) to separate/liberate direct/straight airport flow rates on the basis of the safeguard for shipments of the passengers, loads and mail and to completely relate it to cargo fleet;

b) to separate/liberate direct/straight airport flow rates on the basis of PANX and to completely relate them by this form of aviation;

c) the remaining part of the flow rates (indirect airport) to distribute in the forms of aviation aircraft- having proportionally to the amount of given flights, refined the magnitude of reduction coefficients.

§5. Procedure of the definition/determination of the prime cost of passenger and cargo air transportation.

The prime cost from the forms of transportation is determined on all forms of transport, in this case on rail and marine transport - along to 4 forms of transportation, on river - along 7 forms of

transportation, automobile - along to 2 forms (cargo and passenger transportation). Furthermore, the prime cost of passenger transportation is differentiated on rail transport along 5 forms of draft, on marine transport - along 2 forms of navigation. Is not determined the prime cost of passenger and cargo transportation only on air transport. This circumstance appears those more paradoxical, that the basic production of air transport are the passenger transportation. The ignorance under such conditions of the prime cost of passenger air transportation is intolerant subsequently.

On the basis of the conducted investigation in the development of the procedure of the definition/determination of the prime cost of passenger and cargo air transportation and carried out calculations is establish/installed following.

During the distribution of flow rates for passenger and cargo transportation it is necessary to consider passenger's not only weight with baggage, but also the weight of that equipment and equipment of aircraft, which are necessary for the safeguard of a safe and comfortable transportation of the passengers.

The studies showed that the weight of equipment and equipment of aircraft, which is necessary in one passenger place, considerably differs according to aircraft types. In absolute value it oscillates

for aircraft with GTD [ГТД - gas-turbine engine] within limits from 27.6 kg. for aircraft An-24, to 54 kg. for aircraft Tu-114, comprising at other aircraft: sil[IL] 62 - 44.4 kg., tha[TU] 154 - 35.6 kg., tha[TU] 104 - 50.8 kg., sil[IL] 18V - 39.2 kg., sil[IL] 18D - 46.0 kg., An[AN] 10 - 46.5 kg., tha[TU] 134 - 42.6 kg., tha[TU] 124 - 52.3 kg. Therefore it is illegal neither to take its magnitude within limits 25-40 kg. nor to incorporate this weight and to accept it identical for all aircraft types.

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During the definition/determination of expenditures from the forms of air transportation it is necessary to dismember operating costs for two groups: the flight and airport flow rates, subdividing in turn, each of these groups into two subgroups of the expenditures: straight lines (flight and airport), which have direct relation to passenger or cargo transportation; indirect flight and airport, that have indirect relation to both these forms of transportation.

It is illegal to adopt/employ for the reference of these groups of flow rates for cargo and passenger transportation one and the same principle.

Direct/straight flight flow rates ($\Sigma Э_{лет}^{пр}$) directly are related

by that form of transportation, by which they are caused. In the direct/straight flight flow rates, related by passenger transportation ($\Sigma Э_{зп}^{бп}$). One should include expenditures on feeding and maintenance of the passengers, acquisition for the passengers of newspapers and journal, chess, onboard first-aid kits and hygienic piles, the manufacture/preparation of the forms of passenger tickets, commission reward "Intourist", etc. by that authorized for the realization of passenger tickets etc. and flow rates the remuneration of work of the stewards with deductions for social insurance ($\Sigma Э_{зп}^{бп}$). Here theoretically it is correct to relate also flow rates on amortization and routine repair of the passenger equipment of aircraft. However, is not presented at present possible to isolate the cost of this equipment; therefore virtually thus far cannot and to determine flow rates by amortization and routine repair of passenger equipment and direct to relate them for passenger transportation. Consequently,

$$\Sigma Э_{лет}^{пр} = \Sigma Э_{лет}^{пас} + \Sigma Э_{зп}^{бп}.$$

The distribution of indirect flight flow rates ($\Sigma Э_{лет}^{косв}$) according to the forms of transportation one should produce on the

basis of the weight of equipment and equipment of aircraft, necessary for the safeguard for a respectively safe, comfortable transportation of passengers and safe delivery/procurement of loads.

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In this case the indirect flight flow rates include the flow rates on AviaGSM ($\Sigma Э_{топ}$), amortization of SMP ($\Sigma Э_{ам}$), complete expenditures on routine repair ($\Sigma Э_{то}^{полн}$) and wages of crew (without the stewards) with deductions on social insurance ($\Sigma Э_{зп}^{эк}$).

$$\Sigma Э_{лет}^{косв} = \Sigma Э_{топ} + \Sigma Э_{ам} + \Sigma Э_{то}^{полн} + \Sigma Э_{зп}^{эк}.$$

For the distribution of these flow rates it is convenient to put to use the basic distribution coefficients of indirect flow rates $\eta_{пас}$ and $\eta_{гр}$. The basic coefficient for determining flow rates from passenger transportation is defined as ratio of the total weight of passenger commercial load and passenger equipment to the total weight of common/general/total commercial load and passenger equipment. Coefficient for determining the indirect flight flow rates, related by cargo transportation, is equal to $\eta_{гр} = 1 - \eta_{пас}$. These coefficients

are calculated from aircraft types.

The studies showed that for exploited aircraft the significance of the coefficient of the indirect flight flow rates, related by passenger transportation, varies within limits from $\eta_{пас} = 0{,}62$ for aircraft AN-10 (84 seats) to $\eta_{пас} = 0{,}95$ for aircraft AN-24 ($G_{ком}$ = 4200 kg., 44 seats), comprising for other aircraft types: that-114 - 0.78; silt-62 is 0.74; that-154 - 0.89; that-104 - 0.83; silt-18V is 0.77; silt-18D - 0.69; that-134 and that-124 - 0.89; silt-14 - 0.73; AN-2 - 0.76.

When in enterprise are employed several aircraft types, for the separation of the common/general/total sum of indirect flight flow rates in the forms of transportation are adopt/employed weighted mean in that which was given in flight the hours of the significance of the distribution coefficients of the indirect flight first-order flow rates:

$$\bar{\eta}_{пас} = \frac{\Sigma \eta_{пас}^{i} \cdot W_{час}^{i} \cdot k_{w}^{i}}{\Sigma W_{час}^{i} k_{w}^{i}}; \quad \bar{\eta}_{гр} = 1 - \bar{\eta}_{пас},$$

where $W_{час}^{i}$ time in the air in i type aircraft; k_{w}^{i} - the

reduction coefficient of the physical hours for i type aircraft.

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The separation of the indirect flight flow rates of this aircraft (or this type aircraft) in the forms of air transportation is produced by the multiplication of these expenditures on the coefficients pointed out above:

a) the passenger transportation

$$\Sigma Э_{лет}^{к.пас} = \bar{\mu}_{пас} \cdot \Sigma Э_{лет}^{косв};$$

b) the cargo transportation

$$\Sigma Э_{лет}^{к.гр} = \bar{\mu}_{гр} \cdot \Sigma Э_{лет}^{косв};$$

or

$$\Sigma Э_{лет}^{к.гр} = \Sigma Э_{лет}^{косв} - \Sigma Э_{лет}^{к.пас}.$$

Analogously are distributed indirect flight flow rates as a whole on air transport. Only in this case more expedient to put to use not the absolute value of exudation, but its proportion:

$$\overline{\mu}_{пас} = \Sigma \mu_{пас}^{l} \cdot \varepsilon_{w}^{l},$$

where ε_{w}^{l} the coefficient, which shows the proportion of the given time in the air by this type aircraft in common/general/total time in the air.

The distribution of airport flow rates must be produced on the basis of the account which expenditures it causes strictly the flight (arrival) of this type of airplane and which flow rates it will bear airport for the shipment (method) of passenger and ton of load. For

this purpose airport flow rates are dismembered to expenditures with respect to the safeguard for aircraft departures ($\Sigma \vartheta_{Go}$) and flow rates with respect to the safeguard for shipments of the passengers, loads, mail and baggage ($\Sigma \vartheta_{Gk}$).

In this case to airport flow rates one should relate not only those expenditures, which show at present in the article "airport flow rates", but also wages of ground personnel with deductions for social insurance (without the wages of workers air technical service and the ground-based parties on aerial surveys).

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Furthermore, from article "airport flow rates" one should exclude general output expenses ATB and connect them to expenditures on routine repair SMP [1].

FOOTNOTE [1]. When general output expenses ATB compose small magnitude relative to the common/general/total sum of airport flow rates, it is possible not to separate/liberate them, but to distribute together with airport, completely relating to expenditures with respect to the safeguard for aircraft departures. ENDFOOTNOTE.

Flow rates with respect to the safeguard for aircraft departures are distributed according to aircraft types proportional to the given aircraft departures, and distribution according to the forms of transportation within each fleet is produced on the basis of the distribution coefficients of indirect flight flow rates. For the interrelation of these two proportions are determined the first-order coefficients for the distribution of airport flow rates according to the safeguard for aircraft departures for passenger and cargo transportation.

They are calculated as the weighted mean in the amount of given aircraft departures magnitude of the basic distribution coefficient of the indirect flow rates:

$$\bar{\mu}_{nac}^{an} = \frac{\Sigma \mu_{nac}^{i} \cdot N^{i} \cdot k_N^{i}}{\Sigma N^{i} \cdot k_N^{i}}; \quad \bar{\mu}_{rp}^{an} = 1 - \mu_{nac}^{an};$$

where N^i the amount of aircraft departures in i type aircraft; k_N^i the reduction coefficient of real aircraft departures to those which were given.

When is known (or to more easily determine) the proportion of the given aircraft departures according to aircraft types, the significance of the distribution coefficient of airport flow rates according to the safeguard for aircraft departures it is possible to determine according to the expression

$$\overline{n}_{nac}^{an} = \Sigma n_{nac}^{i} \cdot \varepsilon^{i},$$

where $\varepsilon_{N}^{i}{}_{np}$ the proportion of the given aircraft departures according to i type aircraft in the total amount of given aircraft departures of cargo fleet in datum to airport.

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Putting to use the coefficients pointed out above, flow rates with respect to the safeguard for aircraft departures they are distributed in the forms of transportation analogous with the indirect flight flow rates:

$$\Sigma \vartheta_{Go}{}^{nac} = \bar{\mu}_{nac}{}^{an} \cdot \Sigma \vartheta_{Go};$$

$$\Sigma \vartheta_{Go}{}^{rp} = \Sigma \vartheta_{Go} - \Sigma \vartheta_{Go}{}^{nac}.$$

If airport serve/maintains one aircraft type, then

$$\bar{\mu}_{nac}{}^{an} = \mu_{nac}{}^{1}.$$

From airport flow rates on the basis of the safeguard for shipments are separate/liberated direct/straight flow rates for passenger and cargo transportation.

Into the direct/straight airport flow rates, related by passenger and cargo transportation, with sufficient for practical calculations accuracy it is possible to include the following

expenditures:

a) passenger transportation ($\Sigma Э_{Gk}^{пр\ пас}$),

- the maintenance of urban agency,

- the maintenance of the service of transportation (besides cargo warehouse),

- flow rates for advertisement;

b) cargo transportation ($\Sigma Э_{Gk}^{пр\ гр}$):

- the maintenance of cargo warehouses,

- flow rates on the mechanization of loading and unloading operations.

Indirect airport flow rates with respect to the safeguard for shipments ($\Sigma Э_{Gk}^{косв}$) are distributed in the forms of air transportation either proportional to straight lines or on the basis of the relationship/ratio of the prime cost of the shipment of the ton of load and one passenger. In the latter case they put to use the distribution coefficients of indirect airport flow rates according to

the safeguard for the shipments:

$$\bar{\mu}_{\text{пас}}^{\text{отпр}} = \frac{1}{1+\mu'}; \quad \bar{\mu}_{\text{гр}}^{\text{отпр}} = 1 - \bar{\mu}_{\text{пас}}^{\text{отпр}},$$

where

$$\mu' = \frac{\Sigma O_{\text{т}}}{\Sigma O_{\text{пас}}} \cdot \bar{S}; \quad \bar{S} = \frac{\bar{S}_{\text{т}}}{\bar{S}_{\text{пас}}};$$

$\Sigma O_{\text{т}}$ the amount of sent tons of load; $\Sigma O_{\text{пас}}$ the amount of the sent passengers; $S_{\text{т}}$ the prime cost of the shipment of the ton of load; $S_{\text{пас}}$ the prime cost of passenger's shipment.

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The average prime cost of cargo and passenger transportation on enterprise is obtained by the summation of the direct/straight and indirect flow rates, referred to the appropriate form of transportation, and by their division into passenger turnover and the

goods freight turnover:

a) the passenger transportation:

$$\overline{S}_{\text{пкм}} = \frac{100(\Sigma Э_{\text{дет}}^{\text{пр.пас}} + \Sigma Э_{\text{дет}}^{\text{к.пас}} + \Sigma Э_{\text{Go}}^{\text{пас}} + \Sigma Э_{\text{Gk}}^{\text{пр.пас}} + \Sigma Э_{\text{Gk}}^{\text{к.пас}})}{\Sigma W_{\text{пкм}}}$$

kop/pass-km.;

b) the cargo transportation:

$$\overline{S}_{\text{ткм}} = \frac{100(\Sigma Э_{\text{дет}}^{\text{к.гр}} + \Sigma Э_{\text{Go}}^{\text{гр}} + \Sigma Э_{\text{Gk}}^{\text{пр.гр}} + \Sigma Э_{\text{Gk}}^{\text{к.гр}})}{\Sigma W_{\text{ткм}}}$$

kopecks/ton-kilometer,

where $\Sigma W_{\text{пкм}}$, $\Sigma W_{\text{ткм}}$ passenger turnover and goods freight turnover.

The given procedure of the definition/determination of prime cost from the forms of transportation makes it possible to

sufficiently accurately determine net cost of cargo and passenger transportation. However, in the practice of the work of enterprises often it is difficult to isolate the subdivisions of flow rates pointed out above. Furthermore, frequently appears the requirement for the simplified procedure, which gives the possibility rapidly and simply to determine the approximate value of the prime cost of passenger and cargo transportation. For these purposes is proposed the simplified method whose essence see in the work, given on pg. 61 [1].

FOOTNOTE [1]. Subsequently by author is suggested the division of airport flow rates for straight lines and indirect and is shown, that this simplifies the calculations, without decreasing their accuracy (editor's note).

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The calculation of the prime cost of the passenger and cargo air transport carried out employing the proposed procedure, it showed that it is illegal to accept the prime cost of cargo air transportation equal to the prime cost of the given ton-kilometer, but the prime cost of passenger transportation - 11.1 times is less

than the prime cost of cargc air transportation (by multiplication by coefficient of 0.09, i.e., in the manner that this is made at present. In this case occurs the sharp deviation of the level of prime cost with respect tc the forms cf transpcrtation from its actual magnitude. The size/dimension of this deviation depends on the specific conditions of the work of aircraft enterprize. So, for the aircraft enterprize, which exploits aircraft Ан-24, ~~Ил~~ Il-14, ~~uhether~~ Li-2 and Ан- 2 and the having a small volume transit, the prime cost of passenger transportation is understated to 9.5o/o, but cargo - it is overstated to 47o/o against actual. For aircraft enterprizes with another operating conditions of aircraft is observed reverse picture.

The calculations, given for the average conditions of the IGA, they showed that the prime cost of passenger transportation as a whole on the air transport of the country during its definition/determination through coefficient of 0.09 is understated approximately to 8o/o, and cargo - it is overstated almost to 30o/o.

Illegal to calculate prime cost and by the distribution of operating costs it is proportional to the given production. In this case for above enterprise indicated the prime ccst of passenger transportation is understated to 9o/o, and cargc - it is overstated tc 39o/o against factual.

§6. Definition/determination of the prime cost of given production, passenger and cargo air transportation from aircraft types.

The method of distribution coefficients, placed as the basis of the definition/determination of average from the aircraft enterprize of the prime cost of passenger and cargo air transportation, makes it possible to determine the prime cost of transportation, also, according to aircraft types, since the distribution coefficients of indirect flight and indirect airport flow rates are constructed in such a way that they make it possible to distribute these forms of flow rates not only in the forms of transportation, but also according to aircraft types (after are obtained expenditure in the forms of transportation).

Page 84. So, the indirect flight flow rates, related by passenger transportation, on i-th type aircraft can be obtained through the coefficient of flight flow rates for this type aircraft (distribution coefficient of the second order), which is equal to:

$$\overline{\mu}_{\text{пас}}^{\,i} = \frac{\mu_{\text{пас}}^{\,i} \cdot W_{\text{час}}^{\,i} k_{w}^{\,i}}{\Sigma W_{\text{час}}},$$

where

$$\bar{\mu}_{пас}^{\ i} = \mu_{пас}^{\ i} \cdot \varepsilon_{w}^{i}.$$

Multiplying this coefficient for the common/general/total sum of indirect flight flow rates, we obtain the indirect flight expenditures on passenger transportation, related for this type aircraft:

$$\sum_{i} Э_{лет}^{к.пас} = \bar{\mu}_{пас}^{\ i} \cdot \sum Э_{лет}^{косв}$$

or respectively for the cargo transportation:

$$\sum_i Э_{лет}^{к.гр} = \bar{\mu}_{гр}^{\,i} \cdot \sum Э_{лет}^{косв}.$$

The sum of indirect flight flow rates on passenger and cargo transportation for this type aircraft gives common/general/total indirect flight flow rates on this type aircraft:

$$\sum_i Э_{лет}^{косв} = \sum_i Э_{лет}^{к.пас} + \sum_i Э_{лет}^{к.гр}.$$

Analogously are distributed the indirect airport flow rates according to aircraft types when these expenditures are not subdivided into flow rates with respect to the safeguard for shipments and the safeguard for the saolto-flights:

$$\sum_i Э_{ап\,i}^{к.пас} = \bar{\mu}_{пас}^{\,ап\,i} \sum Э_{ап}^{косв};$$

$$\sum_i Э_{ап\,i}^{к.гр} = \bar{\mu}_{гр}^{\,ап\,i} \sum Э_{ап}^{косв}.$$

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In this case the coefficients of the second order for the distribution of indirect airport expenditures are obtained from the formulas:

$$\bar{\mu}_{nac}^{ani} = \frac{\mu_{nac}^{i} \cdot N_{np}^{i}}{\Sigma N_{np}^{i}}$$

or

$$\bar{\mu}_{nac}^{ani} = \mu_{nac}^{i} \cdot \varepsilon_{N}^{i},$$

where $N_{пр}^{i}$ — the amount of given aircraft departures on i type aircraft.

For each type aircraft

$$\sum_i Э_{ап}^{косв} = \sum_i Э_{ап}^{к.пас} + \sum_i Э_{ап}^{к.гр}.$$

When airport flow rates are subdivided intc expenditures with respect to the safeguard for aircraft departures and shipments, the first are distributed according to aircraft types on the basis of coefficients $\bar{\mu}_{пас}^{ап.i}$ and $\bar{\mu}_{гр}^{ап.i}$. For the distribution of indirect flow rates according to the safeguard for shipments are used the corresponding coefficients, obtained on the basis of the relationship/ratio of the prime cost of the shipment of the ton of

load and one passenger:

$$\overline{\mu}_{пас}^{отпр} \text{ и } \overline{\mu}_{гр}^{отпр}.$$

The prime cost of air transportation of i type aircraft is obtained by the formulas:

a) the passenger transportation

$$S_{пкм}^{\ i} = \frac{100 \sum_i Э_{пас}}{W_{пкм}} \quad \text{kopecks/ton-kilometer}$$

or

$$S_{пкм}^{\ i} = \frac{100 \cdot Э_{пас}^{\ i}}{A_{пкм}^{\ i}} \quad \text{kopecks/passenger-km,}$$

where $\sum_i Э_{пас}$ the total sum of flow rates for passenger transportation according to the i aircraft type is equal to

$$\sum_i Э_{пас} = \sum_i Э_{лет}^{к.пас} + \sum_i Э_{лет}^{пр.пас} + \sum_i Э_{ап}^{к.пас} +$$

$$+ \sum_i Э_{ап}^{пр.пас} \text{ rub/samoleto-year;}$$

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$W_{пкм}^i$ annual passenger turnover on this type aircraft; $Э_{пас}^i$ the prime cost of flying hour in part of the passenger transportation, equal

$$Э_{пас}^i = \frac{\sum_i Э_{пас}}{W_{час}^i} \text{ rub/samoleto-hour;}$$

$W_{час}^i$ time in the air on i type aircraft; $A_{пкм}$ the productivity of flights in part of the passenger transportation, nkm/samoleto-hour;

b) the cargo transportation

$$S_{\text{ткм}}^{i} = \frac{100 \sum_{i} Э_{\text{гр}}}{W_{\text{ткм}}^{i}}$$ kopecks/ton-kilometer

or

$$S_{\text{ткм}}^{i} = \frac{100 Э_{\text{гр}}^{i}}{A_{\text{ткм}}^{i}}$$ kopecks/ton-kilometer,

where all designations are the same, but only they refer to cargo air transportation;

$$\sum_{i} Э_{\text{гр}} = \sum_{i} Э_{\text{лет}}^{\text{к.гр}} + \sum_{i} Э_{\text{ап}}^{\text{к.гр}} + \sum_{i} Э_{\text{ап}}^{\text{пр.гр}}$$ rub/samoleto- year,

$$Э_{\text{гр}}^{i} = \frac{\sum_{i} Э_{\text{гр}}}{W_{\text{час}}^{i}}$$ rub/samoleto-hour;

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c) the given production

$$S_{\text{ткм}}^{\text{пр}\,i} = \frac{100\,(\sum_i \Theta_{\text{пас}} + \sum_i \Theta_{\text{гр}})}{W_{\text{ткм}}^{\text{пр}\,i}} \quad \text{kopecks/adjusted ton-km}$$

or

$$S_{\text{ткм}}^{\text{пр}\,i} = \frac{100\,(\Theta_{\text{пас}}^{\,i} + \Theta_{\text{гр}}^{\,i})}{A^i},$$

where A^i the general productivity of flight, adjusted ton-km/airplane-hour.

Thus, the modelling of the processes of the formation of flow rates and the method of distribution coefficients make it possible to solve the important questions of the economy of air transport. These methods make it possible to solve other problems of the prime cost of air transportation

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