

THE COST OF FLYING STOCK AND NEEDFUL CAPITAL INVESTMENTS

Pripadchev A.D.

Orenburg state university, Orenburg, Russia

The factors influencing on the flying stock of aircrafts and aircraft engines cost are examined in the article. The methods of the cost definition of flying stock are produced which show the cost typical for the definite types of aircrafts and engines and the technical level of home and world practice.

The effectiveness of transport system and the quality of its work are organically connected with the improvement of technical devices of aerial transportation on the basis of modern science and technology. The most important index of technical progress in the field of civil aviation technique is aircrafts economic effectiveness. Naturally that technical economic performances and standards used for determination of aircrafts economic effectiveness differ by various degree of reliability for operated, designed and planned ones. For the first ones they are actual data, for the second ones they are statistical and planned. According to this the evaluation of aircrafts economic effectiveness can be absolute and comparative. The absolute evaluation is meant for determination of being operated aircrafts economic effectiveness or newly built crafts and it is made according to actual technical-economic performances and standards. The last ones are being changed for the time and are defined as planned performances for the given year. The aim of the absolute evaluation is to define the economic performances of aerial technique for planning of operated work for the given period.

Flying stock cost influences on the level of operated expenses (including depreciation and current repairs), on the amount of main productive funds and that's why on profitableness and needful capital investments in flying stock.

Capital investments in flying stock consist of expenses for aircrafts development and engines (scientific research works and experimental design ones), for series production (capital investments for acquisition of engine stock on selling prices) and expenses in connection with putting into operation of

new types of aircrafts (air-crew teaching, expenses on making and acquisition of training equipment etc).

An aircrafts initial cost (on selling prices) depends on many factors. The main ones are:

- the mass of construction;
- cruising speed;

- total series of production that is the whole quantity of built (or planned to be built) aircrafts of the given type by one plant.

The main factors determining the aircraft engine are:

- take off traction or engine mass;
- number M of an aircraft for which the engine is meant;
- total series of production by one plant.

The given methods of determination expenses take into account only the principal enumerated above factors, but not all the factors influencing on the aircrafts price and engines and expenses on their making. The influence of constructive and technological peculiarities, the plant technical level where the article is produced are not taken into account and other are hardly taken into account ones, especially for perspective aircrafts factors. It follows from what is said above that methods are typical and shows that the cost which is conventional for definite types of aircrafts and engines and the technical level of home and world practice.

The aircrafts and engines cost and expenses on their making, which we have in the course of its use, are relative. Actually expenses can differ, but at the same time the correlation in different aircrafts and engines types cost is being kept. That's why the given methods are meant for comparative evalua-

tion of economic different aircrafts and engines types, for economy in the course of parameter research of flight performances and solution of optimistic tasks on economic cri-

terion connected with flying stock development in Russia.

The aircraft cost with its equipment without engine cost in roubles is counted to the formula

$$C_c = YCG_{ch} \cdot G_{ch}, \quad (1)$$

where YCG_{ch} is a specific cost that is aircrafts price with its equipment without engines cost related with the equipped aircrafts mass, r/kg;

G_{ch} is the mass of empty equipped aircraft engines, t.

Cost in roubles, is counted to the formula

$$C_o = YCP_{oi} \cdot P_{oi}, \quad (2)$$

where YCP_{oi} is a specific cost that is engines price related with one Neuton of take off traction;

P_{oi} is take off traction of one engine, N.

Taking into account the correlation and total series of production cost of (TJBE) in roubles is counted to the formula

$$C_o = \left(\frac{42,9P_{oi}^{0,55} \cdot M^{0,62} \cdot \sum n_o^{0,1} + 0,311P_{oi}^{0,6} \cdot \sum n_o^{0,846}}{\sum n_o} \right) \cdot 112, \quad (3)$$

where M is Mahs number to aircraft, where the engine is mounted;

$\sum n_o$ is the total series production of the given type engine;

P_{oi} is the engine take off traction, N.

Expenditures on aircraft development include scientific research works (SRW) and design developments (DD). The latter ones consist of designing expenses, construction and testing experimental articles and other

works except expenditures, related with providing series of production.

Expenditures on development of an aircraft or an engine are meant as expenses related with making a new object in a designed form without expenses on next modifications of the given type of aircraft or engine.

Expenses on aircraft development (without the engines cost) in roubles are counted to the formula

$$C_{pa3.c} = YC_{pa3.c} \cdot G_{ch}, \quad (4)$$

where $YC_{pa3.c}$ is a specific cost of the development (expenses on one ton of equipped aircraft mass).

Expenses on one engine depend on many factors. The main ones are:

- engine traction;

- the degree of bicontouring m;

- the degree of succession of the construction related with earlier made engines.

Expenses on engines development in roubles, are counted to the formula

$$C_{pa3.o} = YC_{pa3.o} \cdot P_{oi}, \quad (5)$$

where $YC_{pa3.o}$ is a specific cost of the development on one ton of power traction.

Capital investments in flying stock in millions of roubles are counted to the formula

$$K = K_c + K_\delta + K_\gamma, \quad (6)$$

where K_γ are expenses directly connected with putting into operation of new aircrafts types (crew staff teaching, making of training equipment and expenses on their acquisition) except needfull capital investments on the

ground-based airdromes devices (airdromes, ATB, mechanization devices and etc).

Needful capital investments on the whole flying stock of the given type in millions of roubles are counted to the formula

$$K_c = C_{pas.c} + 1,05C_c \cdot n_c, \quad (7)$$

where $C_{pas.c}$ are expenses on the working out of an vehicle, r;

$1,05C_c n_c$ are expenses for a vehicle on selling prices, r;

$1,05$ is a coefficient including vehicles price, cost of turnover spare parts fund for an vehicle with its equipment;

n_c is a total number of vehicles of the given type (total series of production).

When a new aircraft is being made, capital investments in flying stock, needfull for vehicles of the given type are counted in roubles to the formula

$$K_\delta = 0,5C_{pas.\delta} + 1,03C_\delta \cdot n_\gamma \cdot n_c \cdot \lambda = 0,5C_{pas.\delta} + 1,545C_\delta \cdot n_\gamma \cdot n_c, \quad (8)$$

in which $0,5$ is a coefficient showing the part of expenses on the engine working out (or its modification) on one type of the aircraft;

$1,03$ is a coefficient including the initial cost of engine and cost of turnover spare parts fund in operation;

λ is a coefficient showing the ration of a summery number of engines mounted on an aircraft or needfull in operation quantity of engines on one engine socket.

According to advance of scientific and technical progress the rule in aircraft is the increasing of selling prices and expenses on their making. It is supposed that aircrafts use,

its technical effectiveness and its effectiveness in operation must increase faster than expenses on their making and operation.

This statement must be taken into account during working out of technical demands on making new aircrafts.

References

1. Aviation: Encyclopaedia / Main editor G.P. Svisthev. M.: Big Russian encyclopaedia, 1994. – 736 p.: il.
2. The methods of evaluation of passenger aircrafts: the text-book / A.D. Pripadshev, N.Z. Sultanov, T.N. Shatalov, O.A. Tihonova. – Orenburg: EPC SEI OSU, 2009. – 126 p.