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## **TECHNOLOGY AND MECHANIZATION OF GROUND SERVICE BY AIR TRANSPORTATION**

With the constant growth of traffic volumes, an increase in the number of hours of aircraft movement, and their capacity, the problem of heavy shelling of passengers has become especially important [1].

Under the shelling of passengers is understood as a whole complex of operations performed by the airport transportation service before departure and after the arrival of the aircraft [2].

*The task of ground shelling of passengers involves:*

- information of the population on transportation issues;
- seat reservation, ordering and selling tickets;
- reservation of seats for transit passengers;
- information of passengers and airport personnel, city agencies and city air terminals about aircraft movement, availability of tickets, tariffs, etc.;
- registration of tickets, registration of baggage, accounting of the actual load;
- acceptance and handling of baggage:
- baggage delivery;
- temporary storage of baggage and hand luggage; transportation and landing of passengers in the aircraft; accounting of seats occupied in the aircraft% B
- transportation, loading, and unloading of baggage;
- calculation of aircraft loading and centering paperwork;
- dispatching work.

When servicing on international lines, additional medical control, customs inspection, and passport and visa control are carried out [3].

In addition to servicing related to the registration of the flight, passengers also use other types of services: mail, telegram, telephone, food and trade enterprises, household and social services (hairdressers, toilets, medical stations, room for mother and child).

*The main requirements for the technological process of airing passengers are:*

- minimum time for servicing passengers;
- minimum waiting time before departure;
- simplicity and ease of maintenance;
- efficiency of air transportation;
- efficiency of utilization of facilities, facilities and service personnel%;
- observance of aircraft alignment;
- exclusion of sending baggage without a passenger;
- the inability to enter the aircraft of a passenger with weapons, flammable substance [4].

Delivery of passengers to the airport and from the airport to the city sometimes takes 1,5 - 2 hours, operations for servicing passengers at the airport take 1,5 - 1,8 hours (if pre-flight service up to 75 minutes, with post-flight - 25-35 minutes). By mechanization and automation, improving the organization of technological processes, the time for servicing passengers can be significantly reduced.

Ticket registration, baggage processing, boarding, obtaining reference data, as a rule, are carried out in the terminal building. The main role is played by the airport terminals, and the city air terminals complement them. Air terminals are divided into small, medium, and large by capacity. The capacity of the airport terminal is understood as the number of passengers that can be covered in the airport within an hour under normal production, technological, and sanitary and hygienic conditions. In this case, the capacity is set not for the "rush" hour, but for the hour during which the volume of passenger traffic is less by 10-20% than the same traffic during rush hour.

Small ones include air terminals with a throughput capacity of 50, 100, 200, 400 pass-hours, medium ones - 600, 800, 1000 pass-hours, large ones - 1500, 2000, 2500 pass-hours.

Depending on the number of passengers, duration of flights, automation and mechanization of the technological process, the following types of ground handling of passengers can be applied [5].

Flight (centralized) - group boarding. Ticket and baggage check-intakes place at the airport. This type of equipment is widely used in the registration of flights over long distances with the throughput of air terminals up to 1000 passengers per hour. One or two transportation workers (each with a registrar and a baggage loader) performs passenger registration and baggage registration 30-40 minutes before the departure of the aircraft. registration ends 15 minutes before departure. There is practically no need to sort baggage for one flight and it excludes sending it to the wrong destination (low need for technological areas and sorting means).

Disadvantages of this type of service: uneven loading of check-in counters for various flight directions, a large number of attendants, passengers standing in line for ticket check-in and baggage check-in.

Free (decentralized) - implemented at all major airports with high throughput (over 1000 passengers, - h). A passenger 1-2 hours before departure can register a ticket and drop off baggage at any workplace of the transportation service in the operating room (at the airport in Frankfurt am Main there are 240 such points), where the registrar operates. Creates a uniform loading of the registration boxes. Registration ends 15-25 minutes before the plane takes off. A passenger who arrives at the airport shortly before the end of check-in may end up in a queue for passengers on longer flights. When sorting baggage, it is possible that it may not be sent to the wrong destination. This raises the need for baggage sorting and data centralization. The duration of the complete set reaches 45 minutes. Although the registration of tickets is carried out for individual boarding in a group. Individual boarding for each passenger, boarding the plane in a group.

Mixed - the majority of passengers are checked out according to the free method, and there are separate counters for those who are late before their check-in. Group boarding.

Simplified - the check-in of tickets and baggage is not carried out at the airport terminal, but at the avanperron or at the aircraft. The baggage is delivered by the passenger to the place of check-in of departures. Baggage is transported from the drive to the aircraft by means of airport [7].

Boarding an aircraft begins 20 minutes and ends 6 minutes before departure.

This type of service is used for medium-haul lines without intermediate landings. It significantly reduces the time of passenger service, but the quality of service deteriorates in bad weather.

Bus - typical for lines with heavy passenger traffic and a high frequency of aircraft movements without intermediate landings.

Passengers in air terminals are not pre-checked out. Passenger tickets are purchased at the airport, on a regular bus, onboard an aircraft. The baggage is delivered to the aircraft by the passenger and is with him. Tickets are monitored upon boarding the aircraft or in the aircraft [8].

Efficient passenger service is facilitated by information at all stages and by all generally accepted means.

Information is a technological necessity for the normal operation of the airport. The use of systems and means of visual information of passengers can improve the culture of service, eliminate the time spent waiting in queues to receive the necessary information from an employee of the information desk, and reduce the likelihood of passengers being late.

Visual information in the form of boards, signs, etc. introduces passengers to the rules of carriage, tariffs, airlines schemes, the placement of premises and passenger service enterprises at the bus station, at the station square, avaperrone, apron (baggage check-in point, information brochure, exit to the apron, luggage room, first-aid post, post office, telegraph, room mother and child, hotel, taxi stand, cafe, restaurant, telephone, toilet, bus parking), shows the number of vacant seats on the aircraft, in the hotel, storage room, ticket and baggage check-in area, signals the boarding gate and more [9].

The radio notification network informs passengers about the beginning to the end of the ticket and baggage registration, preparation and boarding and boarding in an aircraft, check-in of transit passengers, the time of arrival of the aircraft.

When servicing passengers, intra-station, apron, and intra-aircraft mechanization is used.

With the help of intra-station automation and mechanization means, ticket registration and baggage processing, transfer of information on completed flights, transportation, sorting and baggage claim, luggage storage equipment, information on departures and arrivals are carried out. This group includes a centralized air ticket sales console, an automated ticket sales system, cash desks, an integrated flight

dispatching system, autonomous, digital passenger information, complete, autonomous, digital information and flight number, visual information equipment, time indicator, computers; intercom, loudspeaker communication, a system of automatic, semi-automatic or manual baggage sorting, automatic conveyor, dial, lever, passenger escalator.

With the help of apron mechanization, transportation, embarkation, and disembarkation of passengers, transportation, loading, and unloading of baggage, transportation, and loading of catering are carried out. This group includes apron road train, buses with a lifting body, bus storage salons, passenger elevators, moving sidewalks, electric trains, self-propelled and non-self-propelled ladders, luggage trolleys, electric cars, container trolleys, auto-, electric tractors, trucks, loaders, conveyors, car lifts [10].

The optimal number of means of apron mechanization is calculated according to the daily irregularity of air traffic at the airport.

$$\eta = \frac{C_{total} \times K_{d.i} \times K_{service} \times T_c \times m}{60 \times T_{day} \times K_{t.r}}, \quad (1)$$

where  $\eta$  - is the required number of machines of a certain type;

$C_{total}$  - the number of departures per day for the month with the highest intensity of air traffic (from the traffic schedule)

$K_{d.i}$  - is the coefficient of daily non-uniformity of air traffic, representing the ratio of the maximum number of arriving and departing aircraft per hour "peak" to the hourly number of arriving and departing aircraft during the day.

$K_{service}$  is the aircraft service factor equal to

$$f + \frac{C_{initial}}{C_{total}} \quad (2)$$

where  $C_{initial}$  - is the number of initial sorties per day of the "peak" month.

$T_c$  - the duration of one cycle of the machine, min;

$m$  - is the number of machines of the same type simultaneously participating in the maintenance of one air vessel;

$K_{t.r}$  - the coefficient of technical readiness of the machine (within .0.75 + 0.85);

$T_{day}$  is the duration of the machine's operation during the day, h.

With the help of intra-aircraft mechanization, baggage and containers are distributed in the baggage and cargo compartments of the aircraft.

The total number of means of automatization and mechanization of passenger service at the airport is more than I, 5 thousand pieces.

Baggage processing technology and solutions.

For one passenger in most of the packages there is one piece of baggage weighing 10-12 kg (2-3 pieces on international routes). At large airports, about 50,000 pieces of luggage are processed per day, during rush hours - up to 10000 suitcases per hour.

In case of route-based and simplified check-in of passengers, transportation service employees weigh the baggage and record the weight in the check-in list, deliver the baggage to the aircraft, load it into the aircraft and place it inside the baggage room.

With free check-in, the number of operations increases due to the need for baggage sorting. For departing passengers, they consist of the following:

- baggage acceptance (weighing, mark on the ticket and check-in sheet);
- baggage sorting by flights; stowage of luggage on vehicles;
- delivery of it to the aircraft;
- loading into an aircraft, stowing inside an air vessel.

The baggage handling technology for arriving passengers consists of the following operations:

- unloading from the aircraft;
- transportation to the place of issue;
- delivery to unloading devices and delivery to passengers.

The most labor-intensive operations are the processing of baggage of transit passengers, the main of which are: unloading from an aircraft; transportation to the place of issue; sorting and picking; transportation to the aircraft where the passenger crosses; loading into an aircraft.

The loading of baggage (and cargo) into the aircraft is carried out under the control of the centering dispatcher. For each flight, a centering schedule is drawn up, a document on the correct distribution of

baggage (and cargo) in the aircraft. Baggage processing is carried out by intra-station means and loading and unloading.

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