

REDUCTION OF OPERATING COSTS OF AIRCRAFTS' GROUND HANDLING IN A SELECTED COMPANY

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The Diploma thesis is focused at ground handling of aircraft and reduction of operating costs and is divided into the four basic parts. The first part describe formulation of the problem, which is the aim of the diploma thesis and as we proceed with the treatment. The second part defines activities, services and resources for ground handling of aircraft. This part defines operating costs and ways to reduction of operating costs. The main part of thesis analyses ground handling of airport Košice. The final part offers a concept for ground handling of aircrafts. It contains a deployment of staff and reduction of costs using modern technologies.

Keywords: Ground handling of aircraft, airport, resources for ground handling of aircraft, operating costs

1 INTRODUCTION

Ground handling of aircraft represents a set of individual specific operations at airports that have the task of aircraft operations. This issue is an important part of operating airports. With the increasing number of passengers are increasing demands examination. The main objectives of the ground handling of aircraft are speed, efficiency and accuracy with an emphasis on minimizing the time.

Very important is the readiness and availability of sufficient resources to achieve them. Course is also very important the professionalism of staff, effective management and coordination of the activities and processes.

2 FORMULATION OF THE PROBLEM

Formulation of the task includes the current state of the solving problems at home and abroad, what is the purpose of work and what is the methodology of the work.

Aircraft equipment in Slovakia and international airports in Europe, whether in the world are fundamentally different because they used different technologies. Slovakia equips small number of aircrafts, if follows that a system of ground handling is not as challenging as abroad. Requirements for equipment and aircraft ground handlers differ mainly by the types of landing aircraft and the necessary auxiliary equipment.

The aim of the thesis is to describe process of ground handling of aircrafts and show that all these activities are difficult and hampered, because some cannot occur until they finish earlier. The diploma thesis describe reduction of operating costs of aircrafts 'ground handling.

We are used the method of comparing the state of the airport information obtained from the Internet, literature and information from the airport.

3 THEORETICAL FOUNDATIONS OF THE PROBLEM

3.1 Ground handling of aircraft

Ground handling of aircraft represents a set of individual specific operations at airports that have the task of aircraft operations

Aircraft ground services includes:

- **catering service**
- **cabin service** – cleaning cabins
- **ramp service** – processes on the apron (aircraft tow-in and push-back, boarding/deboarding of passengers, loading/unloading of baggage, mail and cargo, toilet and water service, refuelling, GPU, etc.)

Basic requirements of technical aircraft equipment:

- reduce the time equipment
- ensure high reliability without delay
- ensure the safety of aircraft

Resources for ground handling of aircraft:

1. Resources on tow-in and push-back – used for the movement of aircraft
2. Ground power unit (GPU) – main source is the dynamo and battery board
3. Aeromedical support unit (ASU)
4. Refuelling – used kerosene (JetA1) and petrol (Avgas)

Resources for refuelling:

- mobile tanks and fuel dispensers – the airport is not equipped with a high-pressure hydrant system
- hydrant truck and dispenser – the airport is equipped with a high-pressure hydrant system
- 5. Resources for boarding/deboarding of passengers
 - boarding stairs
 - airport buses
 - boarding bridges
 - resources for disabled passengers

6. Catering –used boxes that are attached to the vehicle with the retractable platform
7. Resources for loading/unloading a baggage, mail and cargo
 - luggage tractors
 - conveyor/track loader (BULK)
 - container loader and truck – used ULD – Universal Unit Devices
8. Balancing aircraft – monitoring weight storage
9. Hydraulic filling equipment
10. Implementation of aircraft oxygen and nitrogen
11. Air conditioning
12. Resources for toilet service
13. Resources for water service
14. Resources for de-icing

3.2 Characteristics costs

Costs affect economic efficiency and their scale determines the ultimate profit.

Costs airports

Costs airports are divided into operating and non-operating. Airport operating costs include:

- costs associated with the operation of the airport zone (resources for ground handling, runways, taxiways, etc.)
- costs of the terminal (maintenance terminals, buildings, parking, electricity consumption, etc.)
- costs associated with operation of other buildings and facilities (cargo terminals, etc.)
- others (loans, etc.)

Non-operating costs include various losses and damages, for example the performance of fuel.

Cost reduction

The principal means of reducing costs:

- effectively improve work organization
- optimization of modern technology
- increasing staff training

Factors that affect the cost reduction:

- production
- assortment
- labor productivity
- quality of products
- standardization of technology
- normalization
- capacity utilization
- price and others

Reducing staff costs:

- optimising the number of workers
- outsourcing
- increasing professionalism with effective training program
- benefits

4 ANALASIS OF GROUND HADNDLING OF AIRPORT KOSICE

4.1 Profile airport

Kosice International Airport is the second largest airport in Slovakia. Airport provides scheduled flights or charter flights.

Technical information about airport:

- one RWY (length 3100 m and width 45m)
- one Terminal – built up area: 3 530 m²
 - utilized area: 4 569 m²
 - capacity: 800.000 passengers p.a.
 - check-ins: 8
 - departure gates: 6
 - arrival halls: 2

4.2 Aircraft types used

Turboprop aircraft:

- ATR42-500
- ATR72-500

Jets:

- Q400
- Airbus A320
- Fokker F70

Several reasons, why airport using turboprop aircrafts:

- transport for short distances – better economy
- transport on less busy routes
- transport to/from the airport – smaller demand on the length of the RWY
- lower operating costs
- lower requirements for maintenance and repairs

4.3 Ground handling on the airport Kosice

Airport is prepared 24 hours a day, 7 days a week to handle aircrafts and passengers on a high professional level thanks to qualified employees and renewed technical equipment.

They offer following handling services:

- chocking of the aircraft,
- connecting of the aircraft to the ground electrical power source,
- connecting and starting the engines of the aircrafts by the generator ASU,
- raising of boarding (or operating) stairs to the aircraft,
- loading/unloading of luggage from/to freight hold of the aircraft,
- loading/unloading of cargo from/to freight hold of the aircraft,
- sorting of luggage, including 100% security check,

- cleaning the aircraft,
- letdown/soaking of the toilet system of the aircraft,
- letdown/soaking of water,
- deicing the aircraft,
- antiicing the aircraft,
- filling of fuel (JET A1), etc.

Ground handling of A320

A320 consists of short to medium range, narrow body. Maximum capacity is 180 passengers. Newest types have vertical end wings that reduce costs with lower fuel economy.

Full servicing turn round time of A320 is 43 minutes. Gantt chart covers the complete ground handling A3220-200, adapted to the 45 minute version, along with starting the aircraft.

Minimum servicing turn round time of A320 is 20 minutes. This time is shortened because of waiving several activities of ground handling such as catering.



Fig. 1 A320

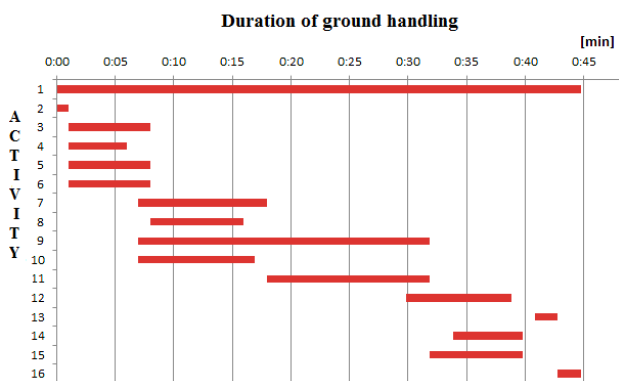


Diagram 1 Duration of ground handling of A320

The list of activities in the order:

1. GPU
2. Connection stairs
3. Deboarding of passengers
4. Unloading Cargo - FWD
5. Unloading Cargo - AFT
6. Potable water servicing
7. Refuelling
8. Toilet servicing
9. Cleaning
10. Catering at door 1

11. Catering at door 2
12. Boarding of passengers
13. Disconnection stairs
14. Loading Cargo -FWD
15. Loading Cargo - AFT
16. Starting aircraft

Ground handling of ATR72

The ATR72 is a twin-engine turboprop short-haul regional airliner. Maximum capacity is 74 passengers.

Full servicing turn round time of ATR72 is 20 minutes. Gantt chart on Figure covers the complete ground handling ATR72

Minimum servicing turn round time of ATR72 is 10 minutes. This time is shortened because of waiving several activities of ground handling such as catering.



Fig. 2 ATR42

The list of activities in the order:

1. GPU
2. Opening the door
3. Deboarding of passengers
4. Unloading cargo
5. Potable water service and toilet service
6. Cleaning
7. Catering
8. Refuelling
9. Boarding of passengers
10. Loading cargo
11. Starting
12. Disconnection

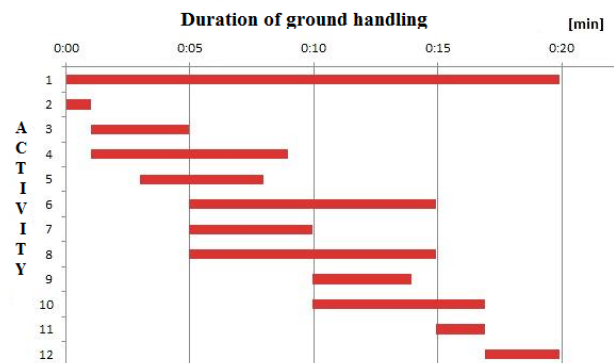


Diagram 2 Duration of ground handling of ATR72

Diagram 1 and

Diagram 2 show the full turn time necessary for the aircraft with full capacity of passengers and baggage.

Minimum servicing turn round time includes only connect the GPU, boarding/deboarding and loading/unloading. Such refraining from certain activities will shorten the total time of operation, which is specified by the manufacturer of a particular aircraft type.

Gantt diagrams show that some processes cannot start until they are completed prior processes. These limitations can cause an increase in times of activity.

Refuelling may take only at the end deboarding for safety reasons.

Loading/unloading baggage is a demanding activity because within a short time must be unloaded/loaded to/from the aircraft. Loading/unloading baggage can be performed by containers or cargo compartment called the bulk. Using containers requires higher costs because of the necessity lifting equipment and baggage is packed. Bulk system is an easier process but requires more staff, resources and there is a greater probability that there will be flight delays.

Boarding can be done until they are completed all the previous ground handling processes.

5 A CONCEPT

Optimization of Kosice airport is a very important factor. It is solved daily and has a direct effect on planning processes, methods of ensuring operational capabilities, infrastructure capacity and personnel provision.

5.1 Deployment of staff

Reduction the operating costs include effective deployment of staff and minimize their storage on the apron. Airport Kosice does not need a lot of staff or resources for ground handling, because traffic density is not a high.

In summer, traffic density is higher, because in addition to scheduled flights are also carried out charter flights. In this period, airport needs a higher capacity of staff to equip the aircraft as quickly as possible.

We propose that this summer, the airport has concluded a contract with a third party and receive external staff or brigadiers, who are sufficiently trained.

We propose that the operating costs for smaller airports reduced in the form of:

- Cleaning vehicles are not always required due to the lower inflight food consumption. Therefore, the elimination of catering services makes it possible to skip the required time for loading trolleys and shortens the cleaning time
- Walk across apron by feet and no bus

- Because of the low revenue rate of cargo transportation, cargo is rarely transported by low cost airlines. Therefore, only luggage is loaded into the bulk cargo hold, and belt loaders are the only required ground support equipment for the loading operation
- Because of the short stage lengths, it is not necessary to refuel at every flight. This means ferrying enough fuel for more than one flight segment, in order to avoid the higher fuel cost and additional time on ground at destination airports.
- More autonomous aircrafts – autonomy can be achieved by means of specialized systems that are incorporated on board the aircraft.
- Own airstairs for boarding/deboarding
- One of the main possible improvements on boarding/deboarding is the use of a third door. This third door may be placed on the centre of the fuselage. Another possibility of boarding improvements is the use of wider doors. In the same direction, wider aisles contribute to a faster boarding and deboarding process. This can be achieved by decreasing the airplane's seat width or introducing foldable seats.

5.2 Optimization of resources for ground handling

IATA Ramp Services proposes to the environmental pollution can be improved mainly:

- development of quieter equipment for ground handling
- using of less polluting fuels
- development of organic products using energy efficient equipment for ground handling

These measures could achieve a reduction in energy consumption, noise, air pollution, soil and groundwater.

The main objective in the future will use of alternative fuel and electric, hydrogen drives, hybrid drives and biofuels. Optimization is a constant lower consumption of staff.

5.3 Using of modern technology

The IATA's mission is to change the way the air transport industry operates – resulting in better service for passengers and lower costs for the industry. The current program "The Simplifying the Business" will save the industry up to US \$18.1 billion every year. This program following projects, including the **Fast Travel Programme**.

Fast Travel Programme offers more choice and more control for passengers, and lower costs for the industry. Its aim is to accelerate processes at the airport, so that passengers do not have wait in long lines. Around 75 % of passengers worldwide want more self-service options. IATA's Fast Travel program is providing self-service options in six areas of a passengers' airport journey - representing annual savings of up to US. \$ 2.1 billion for the industry.

The program includes:

- **Check-in:** Allows passengers to receive their boarding pass via self-service channels (web, kiosk and mobile phone), avoiding long lines at check-in desks.
- **Bags ready-to-go:** Enables passengers to self tag their bags ready for acceptance, speeding up the check-in and bag drop process.
- **Document check:** Allows passengers to scan their travel documents at kiosks for data verification and onward transmission to government agencies, avoiding ID checks at check-in desks or gates.
- **Flight re-booking:** Enables passengers to proactively handle the re-booking for cancelled or delayed flights and obtain a new boarding pass via a self-service kiosk, avoiding long lines at transfer desks.
- **Self-boarding:** Provides automated boarding processes for passengers, reducing boarding queues.
- **Bag recovery:** Allows passengers to report a missing bag at a kiosk instead of waiting in line at a baggage service counter.

By 2020, 80% of global passengers will be offered a complete self-service suite. The advantages of this program:

- lower cost - savings of up to US \$ 2.1 billion per year
- speedier airport formalities
- lower number of necessary staff

6 CONCLUSION

Minimize the cost and staff is the main objective of almost business and so even air industry. The objective is to maximize using of resources for ground handling of aircraft to the smallest apron. The rapid development of air industry, compliant fleet, speeding up and simplifying the processes will in the future require the development of resources for ground handling of aircraft.

Provision of the required and sufficient of resources requires high material costs. In case there is a waiting aircraft will rise to social costs. The main objective is to find the minimum between cost items and the cost of operation and costs associated with waiting.

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