

# MODELLING AND HANDLING PROCESS AT CIVIL AIRPORTS

Tatiana Kontrošová – Ján Kolesár

The goal of the article is to point on the procedure and methodology for processing the thesis on theme modelling of check – in process at civil airports. The main focus in terms of layout of the diploma work is oriented on analysis of check – in process operations, airlines passengers and their luggage at airports. The introduction of work is devoted to basic concepts and legislative environment in the area of performance of check – in process. The core of DP is analysis of possible ways of check – in process at civil airports and their modelling using Critical Path Method. Proposed methods of handling process of the possible solutions are advised in terms of advantages and disadvantages of these proposed solutions.

**Key words:** civil airport, modelling, check – in, Critical Path Method, detection devices.

## 1 INTRODUCTION

In the thesis we set the target to describe a form of modelling to mention possible ways of solution of the handling process of airline passengers and their luggage at civil airport. The work is devoted to analysis of the check - in process airline passengers and their luggage at airports. In the analysis, we used in the Critical Path Method and Gantt charts temporal link of individual parts of check – in process and relationships between them. In the first part of work are described the basic concepts, methods, principles and characteristics of the handling process at airports. The contents of this work are in respect of international conditions and rules to create models and algorithm handling process. The individual manners of check – in process are characterized by description of the advantages and disadvantages for air passengers, airport or airline. The penultimate chapter of DP is devoted to detection devices and their location within the multistage screening baggage at civil airports. In the final chapter of this thesis, we discuss using the models multistage detection systems for control hold baggage and their possible use in check – in process.

## 2 CHECK – IN PROCESS AT CIVIL AIRPORTS

In the introductory part of the work we have defined what is the handling process, what are its types and requirements on them. We devoted the

type of business check – in, which are used, such as the example common check – in, flight check – in, gate check – in and others. We explained the basic principles of manual, semiautomatic and automatic clearance. The content of the chapter is a discussion about passport and customs control and screening of passengers. In the work we present the machinery used for security control of persons and baggage at the moment. The element of the chapter is also devoted to types of luggage and types machinery on their control. To complete the airport process it was necessary to mention time characteristics of the lengths of waiting passengers in a sterile area at the airport. On a practical example, we have shown how important it is to have the space to relax or fill the leisure time of air passengers. We devoted also a description of the transition of the passengers through gate and method of boarding the aircraft and passenger transport to the aircraft in case of remote aircraft stand (Fig.1).

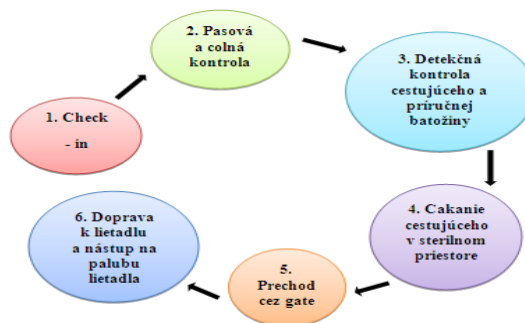


Figure 1 Schema check - in process at airport

The second part of this chapter, is devoted on specific categories of passengers clearance. These include persons with reduced mobility, children or pregnant women and VIP passengers, between whom we include a person in lawful custody and deported passengers. The main focus in the chapter is devoted to the theoretical description handling process and its rules in accordance with international and national conditions. For this purpose it was necessary at the beginning of work to clarify the basic concepts, methods and cycles on check – in process at civil airports.

### 3 MODELING OF CHECK – IN PROCESS

Content of this core chapter of this diploma work is describes the modelling of check in process on civil airports. In introduction of this chapter we describe possible means of check-in process. For this we used knowledge from the first chapter about dividing the terminal on sterile and public. We described in detail, individual options of clearance of passengers, and their pros and cons. Method used to reveal the details of each check-in process were critical path method and mesh analysis. They have provided us a way to classify, qualify and quantify data of check – in process on civil airports. These methods were used to tune each individual step of check – in process. We have used the mesh analysis for each one option of check in process. With usage of the Gantt chart, we shown and compared each possibilities of check - in process (fig.2). Each time of each step of the check – in process were gathered from airport check – in system Gaetan, and were then used for finding the critical path. To make this task complete we used the *MS Project* as basic software for project planning. Using the approximate times gathered from Catalogue of operations of operating manuals we created flowchart for easy overview. We also pointed the before and after happening situations for the best description of process flow. Then after the flowchart was done, we pointed the most crucial steps in process, and thus revealed the critical path.

For analysis and description of check-in process we can use multiple methods of system analysis, for example the PERT diagram. For our cause, we have chosen the *Critical path method*.

All the questions and steps about the creation of system analysis on our project were consulted with Ing. Jan Bacik, CSC.

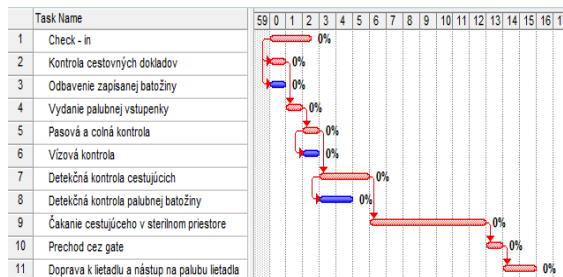
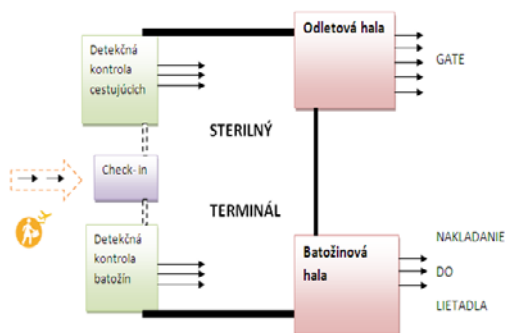


Figure 1 Gantt diagram of check - in process created using MS Project

The result of our research in this chapter is the schematic presentation and comparison of each option of check – in process. After this, we have come to the conclusion, that the check – in process with the shortest time management is the telephone check – in of the passenger before the flight. Although, it is necessary to take into option that each one type of process are not universal, and thus they differ from each other. The main reason for this is to meet the requirements of every passenger and definitely the processes, both technical and security, available at the given airport.

### 4 WAYS OF IMPLEMENTATION OF SCREENING DEVICES

Part that cannot nowadays be separated from check – in process is the luggage screening check, therefore we have included the analysis of deploying these screening devices. We have described basic forms and processes of implementation these devices and also devices used to perform this kind of job. We point that it is the responsibility of airport management to make the proper decision, which device should be implemented in the screening process. It is necessary to take in mind and adapt to new requirements to meet standards and security demands but also to make the check - in process more effective. We have described several possibilities of placing the screening devices in respect of public or sterile terminal (fig.3).



**Figure 2 Possible way of placing the screening device at the airport**

It is not possible to point exactly which system is the most effective, cost efficient or the best in general. In respect of given examples described in the work and analysis of pros and cons we can state that the most appropriate place where to situate the screening device is placing them next to check – in pulsts. In the decision process where to situate what kind of screening device, the airport management has to bear in mind operational airport characteristics that are affecting this decision. Therefore this decision is for every airport different.

## 5 MULTISTAGE SCREENING DEVICES

The last chapter is devoted to the process of security screening of luggage in the scope of multistage screening devices. This process consists of 5 stages maximally. The international standards recommend mostly the generic model, which can have some different variants. We have included several examples of usage on civil airports that are used today. For every different airport, the management can adjust the model based on specific needs and demands. The security management has the tendency to deploy automatic security screenings through fully automatic security screening devices. This implements many advantages into the screening process, like more quality and in long term comparison even cost saves. The most valid argument is the argument of effectivity of implementation of these devices, second is the reliability of these procedures.

Modern screening devices, when properly installed, fine tune up and proper handling have minimal count of false alarms. Minimal is also the possibility of human error, which is one of the most valuable positive of implementing these processes with these devices. Hand in hand with the effectivity comes the time saving advantage. Passengers have to spend less time at the security screening process - cost saving for everyone, yet no security standards are violated.

## 6 CONCLUSION

The main goal of this paper was the analysis of check – in process of passenger at civil airports. Following this task, we had to show possible variations and forms of implemented check in – process. Optimalization of this process is an continual long term task that needs to be in focus to meet the constantly changing air traffic segment. Also the passengers and their luggage varies from day to day, from hour to hour. For these changes, the devices, personal and management must be properly prepared, to meet the demands of passengers and standards used. This process is under constant improvement. To describe these processes, we have used the *Critical path method*. When using this method, personnel responsible for these processes get a user friendly summary for adjusting or modelling these processes. When using the *Gantt diagram*, we can very quickly and easy point the times of the critical path, which is the backbone of the check – in process. Using this diagram we can alter other steps of the process to make it even more effective. For distant observer, the process is not that much changing, as it is for the insider.

Airport managers know best, where to find the weak spots of the process, when there some are, and thus the way of making the process even more effective in conclusion. Reader has to bear in mind that this is a long term decision making process, and for even more challenge, during this long term decisions, more and more aspects have to be taken into decision making process, based on the day they occur. Every aspect that is affecting the process has to be evaluated. For example, nowadays more and more airports are implementing the full body scanner, and hand in

hand with this come more challenges to implement the processes, train the personnel, etc.. The air traffic industry is constantly evolving and all of the aspects of the industry are implying on themselves.

In this diploma work, we have analyzed whole check – in process on civil airports with the use of *MS Project* and the *Critical path method*. When completing the information from the industry, we have experienced unwillingness of contacted airports to reply on our questions. Therefore we had to use the free and accessible information from literature, internet and very valuable information gathered from consultations with my diploma work consultant and supervisor.

## REFERENCES

- [1] ŽIHLA, Zdeněk: *Provozování podniku letecké dopravy a letišť*. Brno: CERM Brno, 2010, s. 302. ISBN 80-720-467-72.
- [2] KOLESÁR, Ján: *Ochrana civilného letectva pred činmi protiprávneho zasahovania*. Košice: LF TUKE Košice, 2010, str. 175. ISBN 978-80-553-0357-4.
- [3] KAZDA, A.: *Letisko design a prevádzka*. Žilina: VŠDS Žilina, 1995, s. 363. ISBN 80-7100-240-2.
- [4] Teoretický časopis: *Vojenské obzory*. [online]. [cit. 2012- 03- 10]. Dostupné na internete: <[http://www.mil.sk/data/att/22853\\_subor.pdf](http://www.mil.sk/data/att/22853_subor.pdf)>

## AUTHOR'S ADDRESS

Tatiana Kontrošová, Faculty of Aeronautics,  
Technical University of Košice, Rampová 7, 041  
21 Košice, Slovak Republic.  
E-mail: [tatiana.kontrosova@student.tuke.sk](mailto:tatiana.kontrosova@student.tuke.sk)

Ing. Ján Kolesár, PhD. Faculty of Aeronautics,  
Technical University of Košice, Rampová 7, 041  
21 Košice, Slovak Republic.  
E-mail: [jan.kolesar@tuke.sk](mailto:jan.kolesar@tuke.sk)

Reviewer: prof. Ing. Martin PETRUF, PhD.