ASSESMENT OF SECURITY RISKS OF TECHNICAL HANDLING OF THE AIRCRAFT

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The main goal of this article is refer to technique and methodology processing of diploma work Assesment of security risks of technical handling of the aircraft. The main attention of this diploma work is technical handling process analysis and assessment of these risks.

Keywords: technical handling, risk, risk management, threat, security

INTRODUCTION

The topic of the diploma thesis highlights the methodology and process for evaluation of security risks in the process of technical equipment of the aircraft on the airport apron.

The text is divided into four chapters with subsections.

The first chapter is devoted to analyzing the current situation in the area of ensuring the security of civil aviation in accordance with national legislation and European Union legislation.

The second chapter describes the activities that are part of the various aircraft technical service. Activities within this process are described as mutual time sequence with Gantt charts.

Security risk assessment methodology is discussed in the third and fourth chapter of the thesis. There are several known methods applicable in the risk assessment process. However, most of the methods are aimed at identifying risk, causes and effects that help us determine the relation between the events leading up to unintended consequences.

1 SAFETY IN AVIATION

The safety of air processes gets attention when problems occur that cannot be hidden. It is virtually impossible to find a process, not only in aviation that would qualify for safety with respect to persons, property and environmental safety. More or less all processes can generate an operation which may be identified as critical. They may include nodes that despite its importance in the process bear a significant risk. This is due to the fact that the current technologies and technological procedures have their limitations. The biggest are the human limitations.

When we talk about Aviation Safety most people imagine terrorists and bombs, but security is not just about preventing attacks. Air safety is essential. Passengers must consider air transport to be safe in order to use it. Great risk in aviation, which is very hard to minimize and that worries many of the aircraft operators, is a large number of passengers at the airport area. The safety of the airport consists of a set of measures and procedures involving human and material resources intended to minimize the loss of material, life and health of people working within the airport under its own operations. Priority in this area are procedures leading to ensure proper operation of the airport. In the case of an emergency is then necessary to follow the procedures associated with saving lives and health of persons.

2 AIRCRAFT TECHNICAL HANDLING

Each activity has a specific timeframe for completing and fluctuates around it. Consideration should be given for the weather conditions and if the aircraft is only to-point or transfer and especially how many workers are performing the activity. In general, the more the workers the faster the process should be, but it is not always the case. Imagine cabin cleaning done by 50 people. That is no longer possible to implement and would take much longer. It follows that these processes have the minimum

and maximum number of workers who can perform the activity, and somewhere in between is the optimum number. Of course, the optimal number is a question of finance.

Errors that should be avoided are arising in each of these processes. Ones are serious, others are less serious. Most of the guidance and work are based on the fact that man is the decisive cause of the accident. Man itself a source of risk. There are the following types of errors in the technical service of aircraft:

- Operator error (error in handling of equipment)
- Negligent disconnection of safety systems
- Errors in communication
- Errors in service, inspection of equipment, maintenance
- Errors in management
- Negligence
- Lack of information

3 RISK ASSESMENTS

For the prevention of major accidents, the airport operator is obliged to carry out an analysis and assessment of security risks, which should contain:

- Identification of the sources of risk
- Identification of possible scenarios of events and their causes, which can lead to security risks
- Estimate the impact of possible scenarios of security risks to the health and lives of people, animals, environment and property,
- Estimate the probabilities of scenarios of security risks
- The size of the risk
- Assessment of the acceptability of the risk of serious accidents.

In the literature it is possible to encounter varying definitions of risk, because they are associated with various human activities. A common feature to all definitions is that risk has an element of uncertainty when it comes to unwanted activity and occurrence of unfavorable situations.

4 RISK ANALYSIS METHODS

Selection of the appropriate risk assessment method is one of the most important factors which affect the quality of the implementation of security studies. In practice, many methods are used in different variations, but most are based on only a few of the best known and most respected methods. By the technical service the following methods are used most often:

4.1 Checklist Analysis

The method of administering questions on gaps and differences in the operating procedure and allows designing improvements in safety. When creating a new checklist, the analyst uses information from the relevant standards and regulations. A list created by an experienced team provides better quality.

Checklist analysis

Questions to assess risks in the technical handling of the aircraft

		YES	NO
1.	They were all employees at the airport for training health and safety?	X	
2.	Were previously identified risks in the process of technical handling of the aircraft?	X	
3.	Was determined greatest possible damage for the airport property?		X
4.	Have been detected the biggest possible harm for the lives of operator error?	X	
5.	Has been surveyed the distribution of risk in the process?	X	
6.	Has been looked at the best possible solutions to the risks?	X	
7.	Has been looked at how often becomes failures?	X	
8.	Has been the individual processes technical handling included in the categories of danger?	X	
9.	Has been looked at what are the necessary counter-measures?	X	
10.	Was it found, what are the additional risks that remain even after the introduction of preventive measures?		X
11.	Is there a total recovery scenario to handle catastrophic risk?		X
12.	Is there partial handling recovery scenarios arising from the risks?	X	
13.	Is there a recovery scenario for every possible scenario for overcoming the risks?		X
14.	Have been identified risks in the process of implementation of aviation fuel?	X	
15.	Have been identified risks in the process of loading and unloading luggage?	X	
16.	Have been identified risks in the process of connecting aircraft to the GPU?	X	
17.	Have been identified risks in the process of checking and cleaning the cabin		X
18.	Have been identified risks in the process of technical inspection and treatment of the aircraft?	X	
19.	Have been identified risks in the process of starting engine?	X	
20.	Have been identified risks in the process of release / pushout aircraft?		X
	Number of responses	14	6

Figure.1 Checklist Analysis

There are many checklists for each area of the airport are there are even more questions. One learns from previous errors and therefore such lists are being worked on continuously under the supervision of experienced analysts.

In the checklist above, we can see that the answer is “yes” in 14 of 20 questions (which means that it is 70% “yes” and 30% of the answer is “no”). Balance of risks in the technical handling is satisfactory. This checklist also demonstrates the readiness of airport employees with potential risks they may encounter at the technical service. In case only 50 % or less of the questions was “yes”, we can assume that there is a problem. The airport is not taking adequate measures to eliminate risks.

4.2 Fault Tree Analysis (FTA)

Fault Tree Analysis is a deductive method, which searches for each accident or system failure and determine the causes of these events. FTA is a graphical model which shows different combinations of equipment failures and human errors that can result in major system failures, called "peak event".

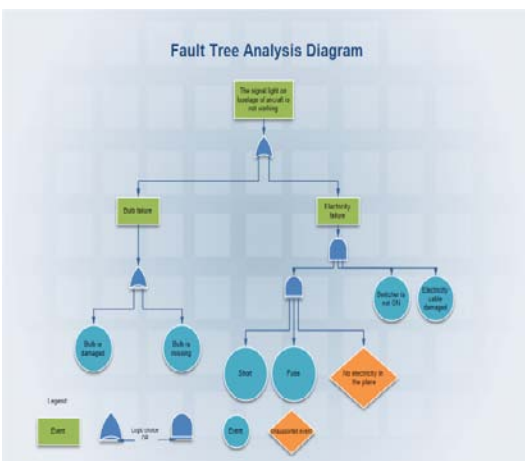

Figure 2 Fault tree analysis

The study may be performed by one or more analysts, who can then recommend safety improvement of the process.

4.3 Event Tree Analysis

The method shows graphically the results of an accident resulting from the initiating event. The result is the accident sequence, a series of failures and mistakes leading to an accident (considering the success or failure of system functions). Accident sequences are logical combination of events that can be converted into a fault tree model and further quantitatively evaluated.
The analysis can be performed by one analyst, but often there are preferred 2 to 4 analysts.

4.4 Ishikawa diagram analysis

This is the diagram of causes and results. The main goal is finding the most likely cause of the problem. Thanks to its appearance is usually referred to as the fish-bone diagram. The basic principle is that each problem (result) has its cause or its combination.

4..5 Hazard and Operability Analysis (HAZOP)

The HAZOP method was developed to identify and evaluate risks in the operational process and to identify operational problems. It is used most often during or after the design phase of the process. It is also successfully used in the technical handling of aircraft. Interdisciplinary team (5-7 people) uses creative, systematic steps to detect deviations from the project, which may lead to undesirable consequences.

There are usually key words being used in the process of detecting errors (less, more, is not, and also, partly, opposite, early, late), which are combined with process parameters. For example, the keyword "not" in combination with the parameter "flow" gives the deviation "There is no flow." The results of team discussions are entered into the table where the columns are the causes, consequences and protective equipment for process deviations. The disadvantage of this method is its high demands on time and labor.

HAZOP Analysis

Airport

Subsystem: Technical handling of the aircraft

Subscription: Technical handling processes on airports aprons

Keyword	Deviation	Cause	Consequence	Action/recommendation
Itisn't	Pressure	Broken pipeline	Fuel leaks at apron	Shutdown of refueling and repair/replacement pipeline
Less	Baggage	Baggage is not where it should be	Flight delay	Notice the fact the workers – correction
More	Stairs	Misunderstanding	Stairs now missing somewhere	Return to original state
Itisn't	Water	Underflow tank	Flight delay	Refill the tank / second fill tank
Other	Push-back car	Misunderstanding in communication	Flight delay	Arrival of the right car
Early	Passengers boarding	Failure of staff at gates	Pressure on staff	Calming passengers that was misunderstanding
Longer	Treatment	Lot of rime, ice	Flight delay	Remove rime, ice

Figure.3 HAZOP analysis

The study represents a systematic and thorough inspection process to identify hazardous conditions and assess operability. It allows evaluating the consequences of errors and detecting those situations in which the error could have serious consequences.

A systematic procedure allows detection of new hazardous conditions that may occur on devices, and detect situations that may lead to disruption of traffic, unplanned downtime, destruction of areas, aircraft, loss of life, but also to the improvement of operating procedures.

5 CONCLUSION

Serious accident
sand mistakes keeps national, multinational and insurance companies analyzing the relation "cause – result". To fill the database which set human imperfection and irresponsibility of the used technique, but on the other hand, provide valuable insights that lead to prevention. Mentioned companies are pushing on legislation, manufacturers and users and as a result of the pressure is still safer technique, advanced technological processes, better prepared process operator. Experience has convinced us that, economic approaches still dominate during preparation construction of technological facilities. Responsible managers seeks how to save at any cost, sometimes even for the highest one. It is gratifying, that such situations are less usual, but the concern is, that those who should be the initiators of more advanced and safer solutions, often become incompetent opponents of workers at lower levels of management, who are often even more responsibilities.

The process of technical service aircraft is difficult. Its complexity is multiplied by the fact, that they are pushed to perform service processes as quickly as possible in order to get aircraft in the air soon as possible. Under such pressure mistakes are common. Therefore it is important to properly prepare for any possible mistake and count with every possible result, the best to avoid them. Even technique is not faultless and we must count with all possible failures. Technological development improves reliability, but biggest shortcomings are always detected when it's too late.

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