

The New Approach to Airport Emergency Plans

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Abstract—This article deals with a new approach to the airport emergency plans, which are the basic documents and manuals for dealing with events with impact on safety or security. The article describes the identified parts in which the current airport emergency plans do not fulfill their role and which should therefore be considered in the creation of corrective measures. All these issues have been identified at airports in the Czech Republic and confirmed at airports in neighboring countries.

Keywords—Airport emergency plan, aviation safety, aviation security, comprehensive management system.

I. INTRODUCTION

AIRPORT emergency planning is a very important element in ensuring the safety and security of air transport. Quick response of rescue units in time of realization of events with an impact on safety/security can save property and lives. For its provision, it is necessary to fulfill a number of conditions and ensure near perfect preparation at a time when "nothing happens" and when is therefore sufficient time for proper planning. Unfortunately most airport operators, primarily the smaller ones, do not see in emergency planning an economic advantage which undoubtedly brings, and refuse to invest in the creation of these plans.

The continuous development of aviation, however, brings the ever-increasing flow of aircraft in the air and on the ground and thus creates the need for smooth airport operations. Airport emergency planning will therefore get more and more attention, because even a small event will have a great impact on the finances of the airport operator. From the perspective of management of financial resources the airport operator would be constantly more inclined to creating and improving the airport emergency plan (AEP).

In the second chapter of this article is therefore shown, what the current most common errors when creating airport emergency plans are and the potential consequences of such behavior. Chapter three then proposes the use of modern methods of Comprehensive emergency system and the use of splitting emergency plans because of national security program and Part-ORO and Part-ORA regulations.

It is important to remember that every airport is unique, which means that general principles can be used on all of

them, but the airport emergency plan shall not only be "glued" together from different parts without a deeper understanding of the theme.

II. PROBLEMATIC PARTS OF AEP

This chapter describes the mistakes committed by airport operators when drawing up emergency plans and its possible consequences.

A. AEP is Necessary Only Due to the Regulations

As already mentioned in the introduction, the airport emergency plan, its creation and maintaining, is at many airports treated as a necessary evil. Thus, it is necessary to create it just for regulatory compliance. The danger in this case lies in the possibility that such a plan is created from a table and in a real situation would be completely unusable for the response.

B. Only One Person Creates AEP

The lack of resources allocated by the airport operator to the creation of airport emergency plan means the inability to devote full attention to the creation as this theme deserves. Emergency planning process therefore fall to only one person at the airport, who cannot include all possible events with impact on safety/security even though the person may have great overview of airport. It may also happen that the person has only his area of interest at the airport and will unintentionally ignore other areas. The AEP will therefore be only subjective matter and unusable for all types of events with safety/security impact.

C. No Communication with Potential Response Units

When creating AEP it is necessary to communicate with potential response units so that the plan would be created according to the requirements of each unit. Failure to address this communication causes problems during subsequent use of the AEP in real situations, as there is not provided good environment for the external response units. That can lead to extending of time needed for the response and therefore greater damage to property and potentially loss of lives than it would be absolutely necessary.

D. Errors in the Hierarchy of Management of Response

By creating airport emergency plan only within the airport without the involvement of external units (and in some cases even with their involvement) are caused errors in the persons status of incident commander. Thus, the emergency plan specifies that the incident commander is this person, but in a real situation intervention commanded would by someone else. Such a state can be found at airports that have their own response units at the airport, making themselves as

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commanders of the whole response. Primarily, this error is found in parts dealing with event with impact on safety.

E. Development of AEP for Individual Airport Units

AEP is a cross-sectional document for the airport operator and airport staff, in which should be specified actions that need to be done in time of realization of events with safety/security impact. Therefore, in the AEP should be specified activities for each individual airport unit, so that the reaction to the event would be dealt with as efficiently as possible. Otherwise, it is possible that some activities will be duplicated by more persons, which can be confusing to other internal and external units also involved in the response.

F. Incompleteness of AEP

In some emergency plans, it can be found incomplete description of taken actions, or only description of the essential points, which are not sufficient for the correct reaction of each unit of the airport. This state of AEP may not be caused by poor emergency plan (what it represents), but only by poorly chosen method of creation, when more detailed information are described in other documents of airport operator. The worsening of this situation is enhanced by placing these support documents at each unit, so there is no mutual knowledge about each task in the response. [4]

G. Insufficient / Excessive Detail of AEP

Another area of concern is the proper range of the emergency plan, i.e. its level of detail. Determining the correct level of detail is very subjective but excessive length of AEP with attention to every detail can be worse than a very simple AEP, in which are written only basic activities. This is caused by the human factor when reading large amounts of information that individual workers may seem irrelevant will discouraged from AEP studying. This makes it highly likely that some of the employees will never read AEP, and the whole emergency planning at the airport loses its meaning. The second option, simple AEP, which specifies only the basic activities are from this perspective better, but here lies the issue in insufficient amount of information for training airport personnel. [4]

H. Specific AEP for the Airport

As already mentioned the creation and maintaining of AEP is very resource demanding, both financial and human. Therefore, as airport emergency plan is in some cases considered a simple copy of other airports AEP with changed identifier. Such approach, however, lead in most cases to creating unusable AEP for the airport, as there are not captured local differences mainly relating to infrastructure and geographic [12], [13]

III. THE USE OF MODERN TRENDS TO AEP OPTIMIZATION

All the issues described in Chapter II can be removed by creating an environment with a positive attitude to AEP at every airport. Reaching this state is complicated, as the person responsible for creating of airport emergency plan for small airport does not use any methods of how to proceed in its

design, and therefore the AEPs are not systematic.

A. Approach 1: CEM – Comprehensive Emergency Management

Comprehensive emergency management (Fig. 1) is a very wide term covering a comprehensive management in crisis situations to minimize damages and injuries. [6], [7] Basic document for this is crisis management plan, which includes policy and management principles, procedures, operations, legislative documents and emergency procedures that are performed in the case of risk events realization. On the basis of this document, procedures how to respond to the emergency - emergency plans, are created. [3]

The cycle of comprehensive emergency management consists of four main parts, which are described below.

1. Phase No. 1 – Mitigation

Through this process it is possible to mitigate, minimize, or completely eliminate the effects of emergency following the identification of potential hazards. In this process, there is a comprehensive analysis of the operating environment, the interaction of individual operation components and then, there are taken such measures that mitigate the risk of the hazardous events realization.

An example might be building adequate infrastructure (short distance from the integrated rescue system units bases), use of appropriate materials for construction (non-flammable, etc.), or appropriate staffing.

This phase is very important in terms of potential prediction of risks and adopting mitigation measures even before the situation can occur.

The tasks of the first phase are:

- Hazard elimination
- Risk reduction
- Mitigation
- Distraction of the risks involved

2. Phase No. 2 – Preparedness

This phase describes the readiness of the airport to face the threat. There are procedures for specific situations, the division of tasks and responsibilities and developed emergency cards, all of which are summarized in the emergency response plan. According to it, every part of airport emergency services know, what to do. In preparing the emergency response plan it is necessary to consult it with other external stakeholders, who could be involved during emergencies, whether it is a firefighter rescue service, medical emergency, police, etc. The quality of emergency response and the success of the situation solution depends on the quality of emergency response plan. The necessary part of preparedness is also regular training focused on the whole portfolio of hazards.

3. Phase No. 3 – Reaction

Phase “reaction” is the ability of emergency services to immediately response to an event that occurred at the airport (accident, bombing, hijack), or to the event which is expected (e.g. landing of aircraft with a technical failure on the landing

gear). This phase is about the practical application of the knowledge from the previous phase. Realization of this phase is the best form of feedback about the functionality we get from the airport emergency plan and emergency procedures. This feedback should be analyzed after each emergency action and the outcomes of this analysis should be implemented to procedures represented in the airport emergency plan or other internal regulations concerned with emergency management.

In addition to response and the initial removal of damage it is also necessary to provide logistical support to the affected area, i.e. the easiest supply of necessary materials and people. There is also a need to provide information to public in surrounding area, if there is a possibility of any further hazard or “only” to inform the public about what happened. Finally, it is also important psychological assistance to the relatives of potential victims.

The response is focused on the following three points:

- Support of the affected area
- To inform public
- To help people in emergency

4. Phase No. 4 – Recovery

The last phase of CEM is the phase of recovery which is focused on restoring the airport operations after realization of the emergency events. This phase is usually the longest and most demanding. In fact it is a whole sequence of processes after the initial action in Phase 3. In the case of an accident at the airport, the recovery phase refers to removal of the wreckage of the airplane, restoration of damaged infrastructure and restoring normal operation on the airport. For this stage, it is necessary to have prepared a procedure for preserving other relevant features of the airport, for example, it must be provided information to the surrounding air traffic.

For a successful recovery from emergency situations is needed:

- Well trained staff
- Background support
- Technical equipment



Fig. 1 Comprehensive emergency management cycle (s: authors)

5. CEM for AEP

For the purposes of emergency planning it is appropriate that the emergency plan should contain all four phases of CEM. Currently, emergency plans consist mainly of phase two and phase three. It actually describes the processes during the realization of the emergency event. According to the responses of emergency units located at airports or other operational staff, it would be appropriate to involve also Phase No. 4 – restoring operation after rescue operations, which is currently missing. In airport emergency plans it is not dealt with cooperation with experts from a range of psychologists in need of help for survivors, where and how to define the necessary space for this service, how to organize it, etc. Method for restoring service after certain types of events is also not mentioned in the airport emergency plans. Legislative requirements for airport emergency plans do not consider this phase as necessary, and therefore it depends on the airport operator whether this phase of the airport emergency plan will implement or will not. The implementation of this phase by the operator increases the information value of the airport emergency plan and its benefits for the operator.

However, AEP should contain all four phases of CEM regardless of the size of the airport, or range of operation. These facts are in AEP reflected e.g. in the details of the plan or the possibility of providing support by internal sources, but in terms of the basic structure of the system, it should be respected.

B. Approach 2: Splitting into Two Parts

Creating of AEP is being addressed with a number of regulations that generally specify what it should contain. These are mostly national legislation (adopted Annex 14) and the laws and regulations dealing with civil aviation of the country. In all of these documents are simple specifications, mostly made up of several points which should be included in AEP and although the regulations are different, the points are very similar. Creating an emergency plan is fully in the responsibility of the airport operator. [5], [9], [10], [14], [15]

There are also other documents that need to be created at the airport before obtaining certification, which requirements it is interesting to compare.

1. Airport Security Program

One of these documents is an airport security program that addresses protection against unlawful acts. However, this also includes emergency plans for the response of these acts at the airport. [8] They are:

- Emergency plan in case of sabotage against airport
- Emergency plan for threats of bombing
- Emergency plan for hijacking
- Emergency procedures in the event of other unforeseen situations with increased threats:
 - Penetration
 - Anonymous telephone threat

Most airports have therefore developed emergency plan for airport safety and security events and events in the airport security program copies the security part of AEP. This means

duplication of parts of two mandatory documents, which would be appropriate to remove.

2. Management System

Another requirement for aviation organization that addresses the emergency plan is the Management System. It is specified in the regulations Part-ORA (Approved training organizations) [1] and Part-ORO (Commercial air transport operators) [2] and specifies requirements for the content of Safety Management Manual [11], which includes Emergency response planning. This requirement duplicated the safety part of the airport emergency plan, and improves it with the overall view of safety management of aviation organization that includes all four points of Comprehensive Emergency Management. This approach is ensured by the classical approach to safety management containing hazard identification and risk management.

Given the identity of the description of system management in both regulations (Part-ORA and Part-ORO) and other information from EASA it is almost certain that the same description will also appears in the regulations relating to other types of aviation organizations including airport operators.

3. The Split

From points 1.and 2.above it is clear that emergency planning is addressed in many regulations and each address only a specific part. This means that there is not required one comprehensive document for airport emergency planning, but several documents. For this reason, airport emergency planning should be comprehensively addressed through legislation to eliminate duplications. The emergency plan should be also divided to the safety and security part, which would correspond to the airport security program and future airport Management system specification. This division is justified logically by incident commanders if he is from the firefighter rescue service or from the police.

IV. CONCLUSION

The improving aviation safety and increasing traffic generates ever-tightening requirements to ensure / secure any events with an impact on aviation safety / aviation security. Honest creation of airport emergency plan is one of the elements thanks to which could be this safety, or security increased. One option is to use errors in the design from Chapter II; the second one is to use a systematic approach.

Described errors should be used by each airport employee, who is familiar with AEP and also by persons responsible for airport emergency planning. Everyone may consider whether AEP is affected by these errors and start the correction process of the current situation, thus contributing to increase of safety and security of air transport.

Use of systematic approach as the second alternative is more focused on responsible person of the airport operator - the accountable manager for AEP or AEP creator. As a systematic approach can be used above mentioned comprehensive management system, respectively management

system, which is dealing with AEP only from the safety perspective, but its procedures, hazard identification and risk analysis, can be used for security part as well.

REFERENCES

- [1] Annex to ED Decision 2012/007/R - AMC and GM to Part-ORA. EASA. Köln, 2012.
- [2] Supplementary document to ED Decision 2013/019/R - AMC and GM to Part-ORO. EASA. Köln 2013.
- [3] R. Soušek, V. Němec, E. Březina, Z. Dvořák, J. Englich, et al., *Transport and Crisis Management*. 1. ed. Pardubice: Institut Jana Pernera, 2010. 260 p. ISBN 978-80-86530-64-2.
- [4] P. Voráč, Airport Ostrava, Ostrava, Security Supervisor, private communication, June 2014.
- [5] Česká republika. Konsolidované znění vyhlášky Ministerstva dopravy a spojů č. 108/1997 Sb., kterou se provádí zákon č. 49/1997 Sb., o civilním letectví a o změně a doplnění zákona č. 45/1991 Sb., o živnostenském podnikání (živnostenský zákon), ve znění pozdějších předpisů. In: 108/1997 Sb. 1997.J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.
- [6] G. Williams, S. Batho, L. Russell, "Responding to urban crisis: The emergency planning response to the bombing of Manchester city centre" *Cities*. Vol. 17, Issue 4, p. 293-304, August 2000.
- [7] R. W. Perry, M. K. Lindell, "Preparedness for Emergency Response: Guidelines for the Emergency Planning Process" *Disasters*, Vol. 27, Issue 4, p. 336-350, December 2003.
- [8] ICAO. Doc. 8973 - volume V: Security manual for Safeguarding Civil Aviation against Acts of Unlawful Interference. In: *ICAO, AC 150/5200-31C*. Kanada, 2007, 7.
- [9] Česká republika. L 14: Letiště. 2009, 641/2009-220-SP/4.
- [10] Česká republika. L 17: Ochrana mezinárodního civilního letectví před protiprávními činy. 2013, 465/2013-220-AVS/2.
- [11] ICAO. Doc. 9859: Safety management manual. In: *ICAO*. Kanada, 2006.
- [12] USA. SLG-101: Guide for All-Hazard Emergency Operations Planning. FEMA. USA, 1996.
- [13] USA. Advisory Circular: Airport emergency plan. In: *AC 150/5200-31C*. USA, 2010.
- [14] Vyhláška č. 108/1997 Sb. Česká republika. Available from: <http://www.mdcz.cz/NR/rdonlyres/4CB4ED74-83BA-486E-B12F-4559051EFA12/0/vyhlaska_108_97_konsolidovane_zneni_15_01_2013_CZ.pdf>
- [15] Vyhláška č. 410/2006 Sb. Česká republika. Available from: <<http://www.zakonyprolidi.cz/cs/2006-410#prilohy>>