

AIR TRANSPORT SECURITY AND THE POSSIBILITY OF INCREASING IT TO TRAINING ON SIMULATORS

Rudolf VOLNER

Abstract: This article is dedicated to the art of improving safety in aviation in response to stress in the aviation sector, the impact of stress on aviation and communications errors caused by ignorance of communication skills at the required level. The first part is dedicated safety management system, the second part is devoted to stress and the third part is devoted to communication errors that resulted in an aviation accident. The paper concludes with a preview of the so-called solutions. Virtual airport, which enables you to use simulator systems increase the level of training. Article was developed within the project solutions TA04031376 "Research / development methodology training aviation specialists L410UVP-E20". TA 04031376 project is solved with financial support from TA CR.

Keywords: Air transport, Security, Safety, Simulator, Training.

LET'S FLY s.r.o., Ostrava International Airport 403, 74251 Mošnov, Czech Republic. E-mail: rudolf.volner@letsfly.cz

1. Introduction

The aim of this article is an explanation of fundamental concepts and analysis of observed facts to enhance the level of safety to flying especially for beginning pilots. The profession professional pilot or the air traffic control officer is undoubtedly stressful profession. Since this is a risky occupation that are exposed to the real threats to human life are to pilots and dispatchers Asked high claims.

With increasing traffic in the airspace there is a greater risk of the conflict situation, and you are more increases the intensity of crisis situations. This can result in the moment when the situation is unbearable and the body begins to defend. Organism triggers reaction, stress.

2. A System Security Management

Safety Management System (SMS) or a safety management system is a new requirement for organizations providing courses to obtain licenses eligibility. National Security Program for Civil Aviation of the Slovak Republic defines the term as: "A systematic approach to safety management, which includes the necessary organizational structures, establish liability, determine the principles and practices" [17].

One of the requirements of the Office in approving the organization is to have in place a management system that integrates and clearly defined responsibilities and direct

responsibility for the security, description of approaches and principles of the organization in this field, establishing a security policy etc.

SMS basis comprises: regulations governing operational safety (safety regulation), the safety monitoring (safety oversight), investigation of accidents and incidents (Incident and Accident Investigation), Analysis of data security (safety data analysis), enforcement of safety (safety promotion) [21].

Among the benefits that the integration of SMS into everyday activities, the organization provides and can include: improve safety and reduce costs associated with aviation accidents and incidents.

Safety as a priority, which boosts the morale of employees, increase the effectiveness that is associated with a reduction in costs, efficiency of the system, which increases the credibility, effective control of the risks of lowering insurance costs [21]. It is also necessary for the successful operation of the system introduced and its continuous development, respect of all parts, which fall into the entire system and effective method communication between all levels of the organization.

Each SMS system must be prepared by the personnel structure of its management. Any organization that wants to meet the requirements of regulations and be approved by the competent authority must be appointing the person responsible for security - Head of Security. For compliance with safety organization must be established so. The Committee for review of safety or, where appropriate organization might have instituted action group for safety.

The principal tasks are: shall report to and receive strategic guidance from the Committee, monitor the operating safety, solve the identified risks, evaluate, what impact have the changes to the operational safety, ensure that security measures will be implemented within the agreed time intervals, examine the effectiveness of previous recommendations [15].

Safety management system ensures: Security Policy, The extent of liability of responsible Head of security, The range of responsibilities of the key personnel in the field of security, Procedures for managing documentation, Scheme hazard identification and management of security risks, Planning security activities, A process for reporting and investigating incidents, Plan your responses in the event of an emergency, management of change, Support the safety, tracking system conformity.

3. Stress in air transport

Stress is a response of the organism to adverse effects on burden. It is thus in response to internal or external stimuli that disrupt normal, stabilized operation functions of the organism, even endanger him. Triggering elements of stress are called stressors.

For the most important stressors in aviation are deemed to fear the risk of a traumatic experience. But they stress can elicit an outwardly less severe stressors such as hunger, disease, hurry and solve complex problems.

However, in today's aviation is only in very rare situations we encounter the straight to exposure lives. Usually, to pilots and dispatchers asked the high physical and mental demands. In that case, the body reacts differently and it's the burden. The difference between load and stress is quite striking. While in long-term and repeated stress to a human demonstrably deteriorating health, under a load is not to say impossible. Furthermore, a man can their resistance to a load of targeting to increase, thereby shifting and threshold of stress. On the other hand in the air transport certainly we meet with an extraordinary load.

Such a load can be divided into: physiological, by dragging, on Climate extremes, the disruption of biorhythm, psychosocial: a responsibility, a life turning point, by omitting partnerships.

Stress in training at the beginning to normal for pilots. Initially students receiving the amount of information passed through the various tasks with which their organism never met and it is therefore natural that they are under stress. However, this stress condition must be mastered in the shortest possible time, so as not hindered by fear or nervousness in ongoing training. Lead has yet to be scamper about tension and stress, but beautiful and undoubtedly an attractive experience.

Each pilot must fully understand the airplane on which he wants to fly. As part of the basic training is the most important to cope mandatory actions. That is to say an exact algorithm to control the activities that the pilot must adhere to exactly the individual phases of flight. Such procedures must master each pilot before entering the booth. Student dominates the mandatory actions perfectly, but after getting on an airplane begins to confuse.

The explanation is quite simple. Whereas it is for him a completely new environment, the organism is not yet get used to the procedure. There also plays a relatively significant role and euphoria. Since the cadet has reached a long-awaited goal, often dream, the organism produces a feeling of happiness. Such influence significantly decreases the concentration and the student begins to confuse. All this in the first days of training may influence stress. Since this is a big burden in the short term pilot concentration is increased on the job. However, this increase is usually short, followed by stress.

Fear is one of the most significant stressors during basic training. Starting with the pilots in the majority, they have no previous practical experience, any unexpected changes can induce stress reaction - a pilot begins to fear. Such a situation may cause, for example an unexpected rotor turbulence.

However, with such a beginning pilot can also experience fear of the ground. This is a situation when the aircraft is in final approach to landing configurations and substantially hurtles directly to ground. Such stressor is manifested in that the pilot subconsciously passes to flare in a larger amount than it should. Such a piloting mistake must then correct, which can increase the stress. Landings then is not smooth. In such a thrust risk tearing stream on wings in too large amount, and the subsequent "hard" landing.

4. Communications and errors

Communication in aviation a century ago has not been granted. Whereas airplane in the Sky was uniqueness, it was not necessary to observe any separation nor heed the danger of collisions between aircraft. After World War II, however, the situation has changed, and with increasing number of aircraft and the formation of the first commercial companies, the sky gradually began to fill planes and it was necessary to regulate these aircraft.

In today's world, communication is a necessity for it to insure both the minimum spacing to aircraft to land, so they know have a route via scud.

We must realize that the airplane is moving in three dimensional space. All flights and routes of commercial flights, most advanced-training flies with the help of apparatus, and very often in worse weather conditions. This means that the pilot actually does not see where flies. His safety is of the old control center dispatcher.

His job is to ensure the minimum separation between aircraft and to gradually enable them to intended purpose. And just to serve communication.

Communication is primarily an information transfer. The basis of communication between people is speech transmission. In classical communications use a number of inaccurate and ambiguous concepts whose meaning can have several forms and are therefore not clear. Hence arise in professional communication, standardized procedures, under which reacts in communications. It means that for a given application or answer a question can be accurately determined formula and not a private improvisations.

Of course, cases occur when the own formation avoided, but in the conventional processes, this is not necessary. Also in aviation is precisely fixed radio communications. Pilots must control it according to Regulation JAR-FCL 1, regulation L9432 [4, 7].

Beginner pilots who are in the initial training PPL initially communicate with the help of instructors. Pilots in the framework of the basic training in making various roles used as a communication language Slovak. It has one advantage, and it is here, that the pilot communicates in their native language and thus to all the mean. For air communications in Slovak is intended Slovak radiotelephony alphabet, it should cadet has Prior to training control. However, as this is required for a pilot certificate should radiotelephone up before the first solo, it becomes the pupils from the beginning ever know not even tell his call sign of the aircraft.

Very important is the communication retrain. The exact phraseology air communication, according to which pilots interact is described in the regulations L9432 – Radio telephone procedures and air phraseology. It is on air school, teach your students how to communicate and how much time do they pay.

In the history of aviation have been few large or small accidents, which cause partial or total was an error in communications. One of such regulations issued on the basis of the investigation of air accidents is also a prescription issued by ICAO, wherein after 'aircraft specifically calls for knowledge of the English language at the appropriate level The effort of this Regulation is to avoid misunderstandings and erroneous understanding that result from communication errors at the level of international aviation.

5. "Virtual Airport" of Company let's fly

The simulation is often used for training civilian and military personnel. This usually occurs in the event that it is too expensive or too dangerous for students use the actual device in the real world. Getting some valuable experience in "a secure" virtual surroundings. Preferably, also the errors that the system in training in safety - critical systems allows. But there is nevertheless a difference between sham used for training and instructional simulations.

Flight simulators (FSTD) are used to train pilots on the ground. In comparison to training in a real airplane, enables the stimulation training practice different maneuvers or situations that are for practicing airplane impractical (or even dangerous) in which pilot and instructor are in an environment which can be characterized as an environment with minimal risk. E.g. failure of electrical systems, failure of equipment, the failure of hydraulic systems, or even a failure to control the flight can be simulated without endangering the pilot or aircraft.

"Virtual airport" is conceived as a classroom for education and training aviation specialists.

The principal elements are: Desktop System simulator 1-4, A simulator system C172 BITD (Basic Instrument Training Device), Control Instructor workplace, Transfer system.

Between various elements of the system is to help the computer network Internet or Intranet.

The transmission system is designed to allow interconnection at management and data transfer between subsystems specified. The transmission is duplex, interacting, what is needed mainly for interconnection of instructor workplace with individual subsystems.

On this basis, a "virtual airport" convenient to use for simulating teaching and training: Radiocommunication on different types of airports and language versions, operating procedures, Coordination of pilots in the airport area.

References

1. Volner Rudolf and all. 2007. *Flight Planning Management*. Brno: Akademické nakladatelství CERM. sro. ISBN 978-80-7204-496-2.
2. Volner Rudolf. 2014. *Modelovanie a simulácia*. Verbum KU Ružomberok. ISBN 978-80-561-0165-0.
3. Šulc Jiří. 2008. *Uebnica Pilota 2008 - Letecká Psychofyziologie*. Cheb: Svět křidel, ISBN-978-80-86808-46-8.
4. Háik Lubomír. 2006. *Lidská výkonnost a omezení*. Brno: Akademické nakladatelství CERM. ISBN 80-7204-471-0.
5. Úlohy JAA. 2014. Available at: <http://www.jaa.nl/introduction/introduction.html>
6. Agentúra pre bezpečnosť civilného letectva. 2014. Available at: <http://easa.europa.eu/language/sk/homephp>.

7. JAR – FCL 1: Spôsobilosť členov letových posádok (letún). 2014. ÚCL. Praha. Available at: <http://lis.rlp.cz/predpisy/predpisy/index.htm>
8. EÚ 1178/2011. 2014. Príloha I. Časť FCL. ÚCL. Praha. Available at: <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2011R1178:20120408:SK:PDF>
9. EÚ 1178/2011. 2014. Preukazy spôsobilosti. Dopravný úrad. Bratislava. Available at: http://www.caa.sk/pdf/personal/preukazy_sposobilosti_1178_2011.pdf
10. EÚ 1178/2011. 2014. Zdravotná spôsobilosť. Dopravný úrad. Bratislava. Available at: http://www.caa.sk/pdf/personal/zdravotna_sposobilost_1178_2011_cast_med.pdf
11. L1. Spôsobilosť leteckého personalu. 2014. Dopravný úrad. Bratislava. Available at: <http://web.tuke.sk/lf-klp/Vagner%20Juraj/LP%20I/L1.pdf>.
12. ÚCL- Metodický pokyn. 3/2003. 2014. Postupy pri získaní, predĺžení a výmene preukazu spôsobilosti pilota vetroňov a získaní, predĺžení a obnove príslušných kvalifikácií. Dopravný úrad. Bratislava. Available at: <http://www.caa.sk/pdf/personal/vetron.pdf>.
13. L2. Pravidlá lietania. 2014. Dopravný úrad. Bratislava. Available at: http://web.tuke.sk/lf-klp/Vagner%20Juraj/PPL%20BIDOVCE/L_2.pdf.
14. EÚ 290/2012. 2014. Technické požiadavky a administratívne postupy týkajúce sa posádky civilného letectva. ÚCL. Praha. Available at: <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:100:0001:0056:SK:PDF>.
15. Prijateľné spôsoby preukazu (AMC) a poradný materiál (GM) kasti ORA. 2014. ÚCL. Praha. Available at: <http://www.caa.cz/file/6671/>
16. Dopravný úrad. 2014. Postupy a požiadavky LÚ SR na vykonávanie skúšok z teoretických vedomostí pilotov lietadiel. Dopravný úrad. Bratislava. Available at: http://www.caa.sk/pdf/personal/smernica_skusky.pdf.
17. ES 216/2008. 2014. O spoločných pravidlách v oblasti civilného letectva. ÚCL. Praha. Available at: <http://eurlex.europa.eu/legal-content/SK/ALL/?uri=CELEX:32008R0216>
18. EÚ 1178/2011. 2014. Zmeny vo výcviku pilotov. Dopravný úrad. Bratislava. Available at: http://www.caa.sk/pdf/personal/informacie_letecke_skoly_postupy_termíny_ato.pdf
19. ÚCL. 2014. Transformácia výcvikových zariadení na ATO. Dopravný úrad. Bratislava. Available at: http://www.caa.sk/pdf/personal/postupy_transformacie_leteckych_skol_ato.pdf
20. Dopravný úrad. 2014. Národný program bezpečnej prevádzky v civilnom letectve Slovenskej republiky. Dopravný úrad. Bratislava. Available at: http://www.caa.sk/pdf/letiska/program_bezpecnosti_prevadzky.pdf.
21. Dopravný úrad. Bratislava. 2014. SMS konferencia. Available at: http://www.caa.sk/letiska_sms.htm
22. Dopravný úrad. Bratislava. 2014. Vývoj legislatívy v civilnom letectve. Available at: http://www.caa.sk/pdf/personal/vyvoj_legislativy_v_civilnom_letectve.pdf
23. EK 1178/2011. 2014. Dopravný úrad. Bratislava. Available at: http://www.caa.sk/pdf/personal/nariadenie_1178.pdf
24. EK 1178/2011. 2014. Aplikácia v Slovenskej republike. Dopravný úrad. Bratislava. Available at: http://www.caa.sk/pdf/personal/implementacia_1178_2011.pdf
25. Motyčka Ivan. Letové standardy – Part ORA – Požiadavky na výcvikové organizácie, Diplomová práca, VUT Brno, 2014, Available at: <https://dspace.vutbr.cz/xmlui/bitstream/handle/11012/27919/DP.pdf?sequence=1&isAllowed=y>

26. *Dopravný úrad. Bratislava. 2014. Systém manažmentu bezpe nosti. Available at: http://www.caa.sk/letiska_sms.htm*
27. *Dopravný úrad. Bratislava. 2014. Manažment zmien a rizík. Available at: http://www.caa.sk/letiska_sms.htm*
28. *Visokai V., Droppa T. 2011. „Vplyv stresu a komunikácie na pilotov vo výcviku“. Študentská vedecká odborná innosť, Technická univerzita v Košiciach, Letecká fakulta, Košice. Available at: http://web.tuke.sk/lf/veda_a_vyskum/Visokai_Droppa.pdf*
29. *Kolajová, J. 2014. „Letové štandardy – PART-ORA – Požiadavky na výcvikové organizácie“. Diplomová práca, VUT Brno. Available at: https://www.vutbr.cz/www_base/zav_prace_soubor_verejne.php?file_id=86856 [Recibido el 27 de octubre de 2017].*