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**TÍTULO:** Evaluación del papel del psicólogo para la seguridad del vuelo en la aviación civil.

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**RESUMEN:** El artículo está dedicado a los problemas de los factores humanos en la industria de la aviación y las técnicas de evaluación de riesgos para la seguridad de la aviación civil, donde la profesión de psicólogo es especialmente necesaria en la selección profesional de personal para la evaluación de la capacidad de los candidatos en diferentes áreas. La investigación de los expertos en aviación se realizó mediante una encuesta, y las observaciones y conversaciones con especialistas prácticos confirmaron la necesidad de profundizar la educación de los psicólogos en las instituciones de educación superior en Ucrania, aumentando la motivación de los estudiantes para trabajar en la industria de la aviación, mejorando el apoyo metodológico de la educación.

**PALABRAS CLAVES:** industria aeronáutica, factor humano, investigación, profesional, psicólogo.

**TITLE:** Evaluation of the psychologist's role for flight safety in civil aviation.

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**ABSTRACT:** The article is devoted to human factors problems in the aviation industry and risk assessment techniques for civil aviation security, where the profession of psychologist is especially necessary in the professional selection of personnel for the evaluation of the ability of candidates in different areas. Research by aviation experts was conducted through a survey, and observations and conversations with practical specialists confirmed the need to deepen the education of psychologists in higher education institutions in Ukraine, increasing the motivation of students to work in the aviation industry, and improving the methodological support of education.

**KEY WORDS:** aviation industry, human factor, investigation, professional, psychologist.

## **INTRODUCTION.**

The aviation industry consists of airports, airplanes, aircrew, and employees. Aviation history is fraught with examples of sabotage terrorist attacks, airport bombings and hijackings. Therefore, the aviation industry is susceptible to criminal attacks or terrorism. Nowadays potential influences of attacks against the aviation security are analyzed.

Reducing risks in aviation sphere plays a substantive role in the worldwide economy. Secure aviation industry increases connection in tourism and trade. In this case, it heightens political and economic growth. Incidents in the sphere of aviation have an unmistakable influence on tourists, especially when aviation incidents result in damage or death of people. For instance, the terrorist attack that occurred on the 11th of September 2001 had a tremendous influence on air transport. It was the worst incident in the history of the United States. It's negative impact was evident in socio-economic, political and cultural spheres (Dillingham, G. L., 2004, Coughlin, C. C., Cohen, J. P., Khan S. R., 2004, Ito, H., Lee, D., 2003).

The objective of the current study was to evaluate the role of the profession of a psychologist in aviation industry.

Aviation Psychology is concentrated on empirically based methods and tools which are used by organizational psychology, personnel psychology, and clinical psychology. Aviation psychologists take part in selection of personnel, its training, reduction of safety risks, self-development of a staff, accident, and incident survey, etc. The work of aviation psychologists follows international ethical standards of psychologists (Kallus, K. W., Bauer, C., Dumendzic, M., Haberschek, S., Jeloucan, D., Streit, B., Vorgincic, C. (Eds.), 2009). Aviation psychology's practitioners use psychological tools and techniques to understand, predict, and describe methods to increase safety and efficiency of aviation flights (Martinussen, M., Hunter, D. R., 2010).

Human factors in aviation mean the minimization of human error and its consequences by optimizing the relationships with systems between people, activities, and equipment within the human-machine interaction. In 2009 the Civil Aviation Safety Authority (CASA) defined human factors as 'the minimization of human error and its consequences by optimizing the relationships within systems between people, activities and equipment'. Human factors in aviation are engaged with the research of capabilities, limitations, and integration of that knowledge for increasing safety work of the staff (Koonce, J. M., 1979). Human factors or ergonomics is about the people within the system. 'System' means rules, procedures, and values that employees have to follow. Human factors, which are often mixed with 'human engineering', are concerned with the design of aviation systems to satisfy the user.

Human factors are a multi-disciplinary science that achieves to find out the way that people's characteristics work within a socio-technical system. Human factors research considers series of situations. For example, this research includes the design of equipment, training, and selection of a staff. This knowledge needs to be applied to the aviation environment, which is dynamic and constantly changing. Understanding the way people act under operational circumstances helps to increase the safety of flights in aviation.

Peculiarities of professional activity of aviation specialists were the subject of research by many scientists. O. Petrenko (O. Petrenko, 2011) studied the psychology of flight crew activities, psychological aspects of aviation safety management; G. Puhalska (G. Puhalska, 2011) studied the problems of training future pilots of civil aviation and the need for creation of pedagogical conditions for the formation of communicative competence of future pilots of civil aviation; I. Khomyuk (I. Khomyuk, 2012) analyzed the qualities necessary for a modern engineer, as well as the basic requirements for profesiograms and international organizations in civil aviation to the profession of aviation engineer; T. Plachynda (T. Plachynda, 2013) studied the training of aviation specialists in Ukraine and in the countries of the European Union; N. Orlenko (N. Orlenko, 2012) - the specifics of professional and applied physical training of future pilots in higher education; O. Kernytsky (O. Kernytsky, 2005) - formation of psychological readiness of cadets-pilots for flight activity; L. Konoplyanyk (L. Konoplyanyk, 2011) - readiness of future aviation engineers to use a foreign language in professional activities; O. Kovtun (O. Kovtun, 2013) - professional broadcasting for future specialists in the aviation industry; I. Kolodiy (I. Kolodiy, 2012) - professional competence of future translators of the aviation industry on the basis of integration of general and professionally-oriented disciplines. The objects of scientific interest of scientists were civil aviation pilots, aircraft maintenance engineers, avionics engineers and air traffic controllers.

## **DEVELOPMENT.**

Nowadays, human factors in aviation industry and risk assessment techniques for civil aviation security are investigated in European countries, especially in Austria. Researches in aviation psychology are also promoted in the department of Psychology at the Karl-Franzens University in Graz. Therefore, Graz has become a heart of new developments in aviation psychology.

Options at the research platform 'Aviation' of the Technical University permit high level simulations of new screenplays. In the field of aviation and space work the University of Applied Sciences and the Medical University. The researches in aviation psychology in Graz are concentrated on the role of warning processes in the work of pilots and air traffic controllers. In the first edition of 'Aviation Psychology in Austria' it is informed about the development of a multi-level approach to data assessments in the field of aviation. This approach is based on the adaptation of classical methods to the operational environment (Kallus, K. W., Barbarino, M. & Van Damme D., 1998). and also new methods. To these new methods belong the Subjective Critical Situations Scale and the Taskload-Efficiency-Safety-Triangle (Kallus, K. W., Hoffmann, P., Winkler, H., Vormayr, E. M., 2010). Although has already developed the psychophysiological evaluation of workload and stress in simulator and real flight conditions.

The aviation industry in Ukraine is a developing industry, which leads to a constant increase in professional demands for training of pilots, operators, aircraft maintenance specialists, emergency specialists, air transport managers.

According to statistical studies of the International Civil Aviation Organization (ICAO) in 2010–2020 a number of violations were recorded, caused by the fault of the human factor, which is due to fragmentary knowledge of air traffic control, imperfect English language proficiency, lack of mutual understanding between pilots and air traffic controllers, disruption of intercultural interaction in crews and lack of critical thinking (Demchenko, I. V., 2020).

Ukraine International Airlines Training Center was accepted with the aim of providing the professional education and re-education (refreshing courses) of aviation industry specialists in line with Ukrainian and International standards. The key aims of UIA Training Center are the following: to provide efficient, structured and professional approach to the education; to develop, prove and restore the programmes and plans used in students' education due to the international standards and

to the documents of civil aviation of Ukraine; to apply modern technology in organization and performance of training process; to practise and improve instructors' skills; to implement objective and unprejudiced assessment of students' test results followed by the standards of professional ethics; to investigate other training centers' experience and to grow the quality of training; to obtain and consider any feedback from students, instructors and internal audit of education process in the activities of UIA Training Center. Teaching activities are carried out by qualified instructors, who have been properly certified and have experience in relevant fields and passed special preparation of conducting theoretical and practical training.

Our investigation of aviation experts was conducted by means of a survey. A questionnaire was developed for them, which consisted of 8 questions and included the following positions: year of graduation from a higher educational institution; received specialty; whether the specialist worked in the chosen specialty, general work experience in the aviation industry; feeling the demand for receiving a psychological help; whether activities in this field were related to many psychological problems, in which spheres they were the most common (in the field of interpersonal relations, during the interaction of leaders with subordinates, in the personal realization of professional duties); whether there was a position of a psychologist at the enterprise, in the airline, in the production subdivision; whether the position of a psychologist was necessary; what were the responsibilities of a psychologist, what education he had; creation of a verbal portrait of an aviation psychologist, with an emphasis on the level of educational training of a psychologist, knowledge of the specifics of the industry; what were the objective requirements for the personal and professional characteristics of an aviation psychologist (Kovalkova, T. O., 2016).

Among the 44 surveyed aviation professionals, 50 % were engineers of various aviation specializations, 22,73 % were pilots, 11,36 % were flight attendants, 11,36 % were leaders of

divisions of aviation enterprises of Ukraine International Airlines and the State Aviation Enterprise "Ukraine", 4,55 % were aviation dispatchers.

To the first question of the questionnaire, which was concerned with the name and the year of graduation from a higher educational institution, 11,36 % of aviation specialists answered that they were graduates from the Kharkiv Higher Military Aircraft Engineering School; 4,55 % - National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"; 84,09 % - National Aviation University. Years of graduation were from 1972 to 2002.

Answering the second question of the questionnaire "What specialty did you master? Do you work in your chosen specialty? What is your total experience in the aviation industry?", 88,64 % of respondents said that they worked in the specialty, 11,36 % of professionals said that they worked in the specialty at first, but nowadays they were holding positions in other specialties in the aviation industry. Regarding to the question about received specialty, 22,73 % of participants mastered the specialty of a pilot; 20,45 % - "mechanical engineer of aircraft and power plants"; 20,45 % - electrical engineer of aviation equipment; 15,91 % - engineer of aviation electronic equipment; 11,36 % - flight engineer; 4,55 % - metallurgical engineer and they worked at the E.O. Paton Electric Welding Institute of the National Academy of Sciences of Ukraine; 4,55 % - dispatcher. Some specialists of the aviation industry had been holding their positions of quality managers for already 4 years, others had been working in aviation-related specialties, but they all are working in the specialty nowadays. The total work experience of specialists is from 11,5 to 26 years.

Answering the third question of the questionnaire about feeling of the demand for receiving a psychological help, what was the reason for this and whether such help was provided, 88,64 % of respondents said yes; 9,09 % - no; 2,27 % - maybe. This was due to a change in the type of work and a sharp increase in requirements and expansion of workload; the constant psychological loading associated with the incompetence of senior leadership, which forced them to move to another

organization; stressful working conditions. Moreover, the help of a psychologist was never provided, and 2,27 % of specialists even went to a doctor, not a psychologist, and the help was provided in the hospital after a heart attack. As said respondents, stressful working conditions determined the necessity of psychological assistance to aviation professionals.

Answering the fourth question of the questionnaire "Do you think that activities in this field are related to many psychological problems? In which spheres they are the most common? ", 100 % of experts said that the activity in the field of civil aviation was just like that; 43,18 % believed that the most problems arised during the interaction of leaders with subordinates; 34,09 % - in the field of interpersonal relations; 22,73 % - in the personal realization of professional duties.

To the next question "What professional destruction is it necessary to prevent from, in your opinion?" 100 % of aviation experts answered that the main destructions were increased anxiety, tension and negative motivation to work.

Answering the sixth question of the questionnaire about whether there is a position of a psychologist in the airline and who leads it, 88,64 % of respondents indicated to its presence, 11,36 % - didn't have any information. Nobody of the aviation experts knew about who was holding this position, but they knew that the psychologist worked in the organizational development department of the Ukraine International Airlines.

To the next question of the questionnaire about the demand for a position of psychologist in an airline, 100 % of experts said that a psychologist was needed because a work in the aviation industry was a stressful activity and there is a great psychological loading due to huge responsibilities, large volume and intensity of work. They noted that a psychologist was needed for selection of staff for work depending on the specifics of activities in the industry, for evaluation the ability of candidates to work in a team, as well as for the psychological rehabilitation of employees after stressful situations.



Answering the question of the questionnaire about the requirements for the responsibilities and education of a psychologist, 11,36 % of surveyed aviation professionals indicated a higher profile education of a psychologist with an inclination on the peculiarities of work of airlines; 59,09 % of aviation professionals said that the psychologist had a higher psychological education and education of such specialist was unknown for 29,55 % of respondents. According to aviation experts, the responsibilities of a psychologist were to identify problems in the team and to have the ability to solve them; to compile a psychological portrait of employees, especially those who had just been hired; psychological unloading, both individual and collective; assistance to leadership in formation of a team, organization of a positive microclimate, relieving tension and stress.

To the next question of the questionnaire about the creation of a verbal portrait of an aviation psychologist with an emphasis on the level of his educational preparation, knowledge of the specifics of the industry and objective requirements for personal and purely professional characteristics of an aviation psychologist, 93,18 % of experts said that he should to be a specialist who knows the features of work in the field of civil aviation, because it is quite specific; he must understand the loads that lie on aviation specialists; 4,55 % of respondents indicated that it is not necessary to know the specifics of the industry, the main thing is to be a professional and to solve problems of employees; 2,27 % of professionals could not answer the question because they had never talked to a psychologist.

Aviation experts noted that a psychologist must be able to communicate with people who are responsible for human lives and understand what can lead to a mistake in this field; be able to help verbally in the event of an accident; to establish relations between the leadership and subordinates of the airline.

Aviation Psychology is an applied science. It studies human activity in civil and military aviation.

Aviation Psychology builds on fundamental research in psychology and other related sciences.

An Italian psychologist A. Gemelli is considered to be the founder of Aviation Psychology in Europe. In Germany, his investigation was connected with selection, evaluation, and psychological assessment of pilots. Similar studies appeared soon in the United States of America and in most of the European countries (Barbarino, M., 2006).

The European Association for Aviation Psychology (EAAP) has been presenting a forum for specialists working in the various fields of aviation psychology since 1956. Being more than 560 members worldwide, they alleviate to support the successful leadership of human activity in the field of aviation (<https://www.eaap.net/about.html>)

The purpose of EAAP is to promote the study of psychology and the scientific implementation of applied psychology in the field of aviation. This purpose is achieved by means of: provision of a network for professionals that are in aviation psychology; organization of workshops and conferences; assistance to education and professional recognition of aviation psychology; publication of periodical newsletters; creation of recommendations for scientific investigation and practical usage of aviation psychology; collaboration and consultation with institutions which are active in related fields; ensurement of support to aviation authorities, etc.

A person who is working in the field of aviation psychology looks for professional incitement, he or she assists the development of the human factor in aviation.

Accreditation requirements of Junior Aviation Psychologist are the following: a degree in psychology, membership of EAAP, presence at an aviation psychology related course or conference, six months internship with a minimum of fifty documented hours of supervision by a psychologist working in an aviation organization or a successful diploma thesis regarding to aviation psychology or human factors related topic.

Accreditation requirements of the Aviation Psychologist are the following: a Master's degree in psychology, keeping EAAP membership for a minimum of one year, three years with a minimum 3000 of working hours training in applying aviation psychology in civil or military aviation, continuous professional employment in the field of aviation psychology, having passed two full EAAP training courses on different aviation psychology themes.

Knowledge of aviation technical professional must be documented by: being a member of a flight crew, engineer, cabin crew or other technical professional; conducting a theoretical course examination; proving an inspection in the technical aviation field.

Accreditation requirements of Human Factors Specialist are the following: partner membership of EAAP, keeping EAAP membership for a minimum of one year, appropriate professional training in the field of human factors in aviation, three years with a minimum 3000 of working hours training in applying human factors in civil or military aviation, having passed two full EAAP training courses on different themes of Aviation Human Factors.

Knowledge in the aviation technical field has to be documented by: being a member of a flight crew, engineer, cabin crew or other technical professional; conducting a theoretical course examination; revealing to the Board an inspection in the technical aviation field.

After five years the certified Human Factors Specialist must be re-qualified. The demands for re-qualification are the following: documented a continuous professional employment in the field of aviation psychology, having passed one EAAP training course in the field of human factors in aviation within the 5-year period or one course at other institution as equivalent for EAAP training course, if it is certified by the EAAP board.

**CONCLUSIONS.**

Aviation is associated with constant tension, stress, responsibility for the lives of hundreds of thousands of people. The profession of a psychologist is especially necessary in the professional selection of staff, for evaluation of the ability of candidates to work in a team, during psychological rehabilitation of employees after stressful situations, for establishing of relations between leadership and subordinates of the airline, etc. Nowadays in Ukraine, there is a problem related to the lack of a psychologist position in most airlines, this is primarily due to the neglect of leadership of psychological needs for staff assistance.

Unfortunately, in Ukraine most airlines do not have the position of "psychologist" at all, although the need for it is obvious. However, Ukraine International Airlines has a position of "personnel manager". Working in this position, specialists carry out some of the functions of a psychologist. In particular, this airline employs four psychologists in the organizational development department of the Ukraine International Airlines, who carries out the same functions: professional selection of flight attendants, pilots, aircraft technicians, etc.; writing psychological characteristics of an aviation specialist; staff adaptation; assessment of the quality of its work; organization of training; introduction of motivational programs, personnel projects, organization of a favorable microclimate, interpersonal relations in the airline, etc.

Surveys, observations and conversations with practical specialists in the aviation industry confirmed the necessity to deepen the education of psychologists in higher educational institutions of our country for work in the aviation industry by increasing students' motivation to work in the aviation industry and improving the methodological support of student education.

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