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HUMAN FACTOR AS A SAFETY ELEMENT IN AVIATION

The article examines the role of psychosocial factors in ensuring the safety of aircraft and their role in training of future airmanship specialists.

Among the causes of aircraft accidents we can roughly distinguish the following main groups: the first is associated with a technique failure, the second – with the influence of environmental factors (e.g. weather conditions) and, finally, the third is caused by a human factor. Statistical data prove that the majority, approximately 70% to 80% of the total number of aircraft incidents and accidents are associated with the human factor. In addition to that besides the systemic and organizational errors of crews, which violate the rules of flight, you should also take into account some errors in the actions of ground service specialists including controllers, mechanics, designers, etc. We emphasize that some certain individuals fly planes that is why the importance of the role of human factors in performing and carrying out flights should not be overlooked. And of course we can hardly eliminate from their professional work personal life and social processes, relationships with crew members, previous experience, personal tastes and passions, and so on.

Each individual does not learn just passively the meaning of different ideas and concepts, he processes them. This content can be assimilated by him more or less completely, more or less correctly. It can manifest in his life quite differently, give to his personality a different sense, cause certain feelings and motives, or leave him indifferent, as if not touching his personality at all [13, p. 164]. These specific psychological features, which human knowledge and ideas acquire, of course affect scholarly and professional activities. That is why one of the very urgent problems of modern science appears to be the problem of human factor in technical activities and aviation in particular. Indeed, in similar situations far not every pilot is supposed to commit errors. That became the very basis for the introduction of the concept of the human role, so-called "personal factor" and in connection with aviation events, linking it with the cause of aircraft accidents and not with technical difficulties, but with the individual-psychological qualities of the crew and ground services specialists.

It should be noted that today in the scientific literature there is no single approach to understanding of the human factor. Thus, some researchers include into the understanding of a human factor some limitations of the crew and ground services specialists, attributable to specific equipment with which they interact [3, c. 11]. Others understand human factor as a set of psychological, physiological, biochemical, anthropometric and other human qualities, which are defined under the criteria of functional conformity with man and technology [10, c. 129]. Finally, in accordance with the definition adopted by the ICAO "human factor is the science about people in those circumstances in which they live and work, their interaction with machines, procedures and the surrounding circumstances, and the interaction between people" [9].

M. Polanyi was one of the first who wrote about the role of the human factor in science, noting the impact of intuition, personal and scientific skills on scientific activities, which are obtained only through the practical participation and can cause distortions and errors. Once, in particular, N. Maskelyne, the royal astronomer, fired his assistant D. Kinnebrook because he always recorded the passage of celestial bodies more than half a second later than his supervisor. N. Maskelyne did not understand that such a careful and cautious observer could allow a systematic shift over time because he used a certain method of observation. 20 years later F. Bessel eliminated that contradiction, having justified D. Kinnebrook, and initiating experimental psychology, which since that time has claimed that you can always expect these individual differences of perception.

everywhere [7, p. 42]. As rightly M. Polanyi observes, such cases are quite numerous in the history of science, which are caused not only by psychophysiological characteristics of a scientist, but also by his social and psychological characteristics. Thus, scientists have spoken about the human factor and its impact on scientific and professional activity pretty long. Regarding the introduction of the concept of "human factor" and the disclosure of its content in aviation it is primarily due to the achievements that engineering and social psychology, social philosophy have brought about in the study of the nature of interaction between pilots, dispatchers, operators of technical devices, surrounding environment and other specialists of their joint activity.

If previously, the process of human interaction with an aircraft was provided by pilots with simple motor reactions, then today, as a result of permanent sophistications of aircrafts, the number of controlling and monitoring elements is dramatically increasing. A pilot has to work with a complex information system, and the role of intellectual, emotional and psychological components in his profession grows much, since man can not get rid of the limitations caused by his biological nature, psychophysiological, social and psychological characteristics.

Of all the categories of aviation specialists the greatest interest in the successful completion of a flight, of course, belongs to the flight crew because the very crew is exposed to a direct threat to life and bears moral and legal responsibility for the consequences of the flight, often radically changing their future life [6, p. 6].

Therefore when investigating the causes of an accident, now two basic approaches to the explanation of the problem have been formed. The first sees tracing faults of a crew as an ultimate cause of investigation and the crew or the pilot who made a mistake are considered guilty. The second approach is based on a systematic methodology. Under this approach a faulty action of the crew is not final but the initial point of investigation, during which the totality of relationships and interactions are revealed, out of which cause-and-effect relation of appearance, adverse development and the way out of the particular situation of flight come to light. Thus at the beginning it is assumed that the cause should be sought not so much in the crews, but in all elements of the aviation system. On the one hand within this problem there are the official representatives of civil aviation, on the other – the representatives of the crews and their advocates who are pretty consistently supported by industrial science and who strongly disagree with this assessment of the problem. Modern aviation practice is undoubtedly very rich in examples of unprofessional actions of the crew [11]. But is everything so definite here?

Some scientists propose to examine the professional reliability of a pilot in the light of an aviation system, of its every component, which has its specific features. However, they pay a special attention to one of the most important features of the pilot's profession, namely that the pilot's activity in an assigned situation and in an emergency case of a flight according to their mechanism are two different activities. As in "... emergency situations no stereotypes, but new forms of reaction are needed" [11]. Relying on the fact that an experienced pilot will successfully cope with everything in difficult conditions of a flight appears to be less grounded.

As A. Yurevich notes, a man looks at the instruments, but sees some empirical data and a conversion of the data to another semantic system takes place. This system is formed in the observer's thinking and bears the imprint of his personality. His intrapersonal "World" incorporates certain linguistic culture, socio-psychological features of the personality, his former experience, some peculiarities of the interaction with the social environment and many others [14, p. 23]. Thus, the results of the observation are given a status of the facts. But at the same time the scientist emphasizes that the facts are not identical to the results of the observation, but include their specific interpretation that is somewhat subjective. And, as a psychological research shows, even specially trained observers see what they expected to see. As a result the same data are seen in different ways – depending on their mode of interpretation. It happens because the development of the aeronautical engineering is accompanied by an increasing number of interpretive units, by growing dependence on personal characteristics of the observer and the interpretative procedures carried out by him. Thus, the operation complexity of modern aircrafts requires from a human operator the availability of some certain personal and psychological characteristics, the ability to quickly process large

amounts of information, make decisions and implement them into practice in a short period of time. Therefore, it is not surprising that a complexity of research technology is tantamount to the growth of personal factors mediation.

Science builds models that simulate the behaviour of objects and provide mathematical calculations of such conduct, implementing interpretative acts of awareness of research data and regulatory procedures for their explanation and description [5, p. 399]. Consequently, the result of the observation has little to do with photographic mapping of the observed objects, and bears the imprint of self-expression of the research subjects and is embedded in some way "... in the social mechanism that controls the interpretation of its meaning (universal dimension) and some conditions of its practical use (showing a generally valid measure)" [4, p. 157]. So under conditions of present "...being in the world of computer information space or virtual activities" [8, p. 4-5] there is a need to study the influence of "virtual reality" and "virtual communication" both on a person's behaviour and on his psycho-emotional complex. For though, the spread of innovative technologies and transmission facility, storage and processing of information do not reduce the role of personal knowledge, still they cause a qualitative transformation of "anthropological foundations of personality, his personal visual space" [8, p. 8]. Ironically, the development of technology, creation of which is based on formalized knowledge, only increases the value of personal knowledge. Personal knowledge fills gaps in objectivised knowledge, which is always insufficient for performing a complete cognitive act. Therefore, contrary to a popular belief that changes in the process of scientific cognition caused by the advent of computers and information technology makes the modern science "impersonal", the role of personality factors in it never decreases. The peculiarities of interpersonal interaction mechanisms depend on social and psychological factors implicitly present in the professional communication that are "... a tool that provides integration of individual actions in collaborative group work and communication. ... Purposeful joint activities and interpersonal communication are impossible without understanding a partner, his purposes, senses, plans and intentions" [1, p. 223-224]. Thus, in this case we can agree with L. Fleck, who notes that a well-organized team is a knowledge carrier, the volume of which outweighs capabilities of an individual [12, p. 54]. This signifies the increasing role of communication between crew members. And a communicative factor is the ability to collaborate and interact in a team, responsibility, initiative, the system of life values. All messages must be clear, understandable and unambiguous. Crew members must be on the same wave, as their interaction, intuition, ability to resolve conflict situations can save many lives. In contrast, cultural differences, language barriers, inattention, fatigue, stress, etc. can lead to fatal consequences.

Microelectronic Revolution, demonstrating the power of human intellect, changes the mechanism of interaction between humans and machines, encourages development of new forms of communication and research teams. "Regarding a computer as a technical device (artefact), which performs rather a mediate function in transferring knowledge from one person to another and acts as an original text ... forces us to focus on the personal implicit component of knowledge and also on the cultural preconditions for communication between people using computers" [2, p. 56], says A. Alekseyeva. This is, in turn, the evidence that in the era of a rapid growth and complexity of engineering the role of personal knowledge does not decrease.

This view was supported by V. Yurevich, noting that the development of technology, the mass distribution of information transmission mediums, the creation of which is based on a formalized knowledge, does not belittle the role of personal knowledge, but only increases its value because objectivised knowledge is always insufficient for a complete cognitive act. It is always constantly supplemented with subjectified personal knowledge [14, p. 29]. Although information technology qualitatively transforms the entire process of pilots' professional activity, no computer can replace humans. So we cannot deny here the role of human factors to ensure flight safety.

Conclusions

Pilot's work is associated with some considerable nervous tension and per se is a sensitive indicator of the neuro-psychological sphere. After all, first in most critical situations people have a

solve several problems simultaneously and secondly, to overcome the situation a hard time limit is given, which requires more intensive processing of information and so not everyone is capable of. Therefore, social and psychological characteristics of the crew, which include: human capabilities, level of health, performance, type of nervous system, level of social maturity, values, interests, needs, etc. are the dominant factors in cockpit failures besides the level of professional training and the volume of general and special knowledge.

Flight safety in general, as the problem of "human factor" in particular, is a system category, which cannot be resolved by partial measures at all. Therefore, by the further development of aviation technology, solving this problem they should take into account the above-mentioned factors when selecting professional specialists, and also the peculiarities of interconnection of man and technology.

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