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Sufficient English language proficiency as a means to ensure flight safety

Safety is the priority and strategic task of most states in the modern world. Safety can be economic, social, environmental, informational, etc. COVID-19, which covered most of the globe, prioritized the perception of the world and demonstrated insecurity and unpreparedness for emergencies that can paralyze the lives of individual spheres of the economy, education, healthcare, and the entire state. In this situation, the "human factor" comes to the fore as a powerful and only tool for regulating processes and developing new concepts that are happening in society.

Communication in the field of aviation is recognized as crucial to air safety. Besides the technical serviceability of air transport, flight safety implies the intellectual capital of aviation specialists, particularly aircrew. Sufficient English language proficiency is an essential prerequisite to air traffic safety. The level of foreign language proficiency plays a special role in ensuring safety [1]. While researching aviation accidents, human-human interaction became one of the first factors to be studied. Pilot errors mostly happen because of deficiencies in crew communication and collaboration [1]. Thus, insufficient proficiency in English frequently leads to accidents and disasters since the pilots cannot adequately convey information to air traffic controllers and vice versa.

Professional aviation communication includes specific professional speech communication between air traffic controllers and aircrew concerning issues of operating an aircraft flight; communication of air traffic control personnel and aircrew with ground personnel to ensure the organization and safety of a particular flight; communication of aircrew indirectly (through announcements) or directly with passengers. The first one is particularly considered as the key factor of flight safety [2]. The use of composite materials is due to high strength and stiffness and low weight compared to metallic materials. However, a significant disadvantage of polymer composites is the possibility of hidden internal destructive micro shock due to various influences, which can cause accidents in the operation of the aircraft.

In 2017, The Civil Aviation Authority (CAA) published the results of independent research on the English language proficiency of pilots and air traffic controllers in terms of aviation safety. The study highlighted a range of problems, from poor English proficiency of pilots and air traffic controllers who are not native speakers to the use of dialects and slang by British pilots that are often incomprehensible to foreign air traffic participants, which consequently may endanger the lives of aircrew and passengers. The study analyzed the recorded cases of language misunderstanding between pilots and air traffic controllers and found that the most common ones are the following:

- readback - hearback errors;
- call sign misunderstanding;
- English language proficiency below ICAO standard;

- reduced situational awareness because of multilingual radiotelephony, the use of multiple languages;
- the use of non-standard phraseology (by both native and non-native English speakers).

The study also highlights that the ICAO standards of language proficiency are not tough enough to establish appropriately clear communication between pilots and air traffic controllers. Besides, the underreporting of language competence issues by British pilots and air traffic controllers is revealed. It is identified that there are sufficient grounds to suspect that certain specialists who are not native English speakers are not being tested at all, but rather granted ICAO Level 4 certificates by unfair means. Also, cheating on aviation English tests is considered to be a factor that endangers aviation safety [3].

The report shows occurrences with both native English speakers and foreign ones. For instance, it describes the case, taken from the study by T. Tiewtrakul and S. Fletcher [3], involving Thai air traffic controllers who transmitted instructions with a strong accent and rapid speech rate, which resulted in increased misunderstanding and confusion [4].

Other examples cover cases of misunderstanding in British and French airspace, again related to the communication of native and non-native speakers and substandard language proficiency [4].

Taking into account the information mentioned above, the importance of sufficient English language proficiency does not require further comment. The issue is to develop new and improve existing techniques of language training for pilots and air traffic controllers based on the analysis of the most common language errors. According to scientific researches, the latest include the following ones:

- grammatical (incorrect use of the negative particle NOT, as well as singular and plural forms, confusion of verbs and gerunds, tense forms);
- distorted perception of numbers;
- distortion of the phonetic image of the word;
- omission of meaningful elements (prepositions, auxiliary words in questions);
- intentional omission of words;
- the use of non-existent elements;
- reliance on an individual auditory association rather than on information.

Regarding the fact that many experts criticize the level of English proficiency of pilots and air traffic controllers, and the requirements of the ICAO Level 4 English certificate are considered insufficient, special requirements are put forward for aviation English teachers. Equal responsibility lies with those who study aviation English and those who teach it (first of all, it is about the maximum degree of awareness of responsibility and the need to obtain and constantly improve the level of language proficiency).

Concerning methods and techniques used in teaching aviation English, it is necessary to organize the educational process on the following principles:

- the idea of safety should be prioritized;
- the educational material should be relevant and expedient;
- the educational material should be situational;
- authentic listening and speaking material should be chosen carefully;
- individual characteristics of perception should be taken into account;
- practical material and errors associated with misunderstandings between pilots and air traffic controllers should be analysed while providing a training course [2].

It should be noted that misunderstandings and poor English have also led to fatal flight accidents throughout the history of aviation. One of the most terrible aircraft crashes in history, resulting in the tragic deaths of hundreds of people, is considered to be the Tenerife airport disaster. On March 27, 1977, two Boeing 747 passenger jet airplanes operating KLM Flight 4805 and Pan Am Flight 1736 collided on the runway in low visibility conditions. Of course, most airplane crashes are not the result of a single failure or error. However, the main reason for the accident was found to be a misunderstanding that took place between the air traffic controller and pilots. When one aircraft operating KLM Flight 4805 was in position, the first officer requested takeoff clearance. In turn, he only received the route clearance from the air traffic controller, which was mistakenly understood as a takeoff clearance. After repeating the instructions back, the first officer added, "We are at takeoff." The air traffic controller understood this answer as confirmation that the crew was ready to take off and said "OK," which confirmed the pilots' delusion that the clearance had been received. Thus, the KLM crew started takeoff without authorization. Immediately after that, the air traffic controller added, "Stand by for takeoff. I will call you." At the same moment, the Pan American crew informed the air traffic controller that they were still taxiing down the runway. Any of these messages would have been enough for the KLM crew to realize their mistake, however, due to the interference (the messages occurred simultaneously and overlapped), they were not audible in the KLM cockpit. Thus, the misunderstanding resulted in 336 deaths.

After the crash investigation was completed, it was concluded that the most likely cause of the disaster was ambiguity in the English language and misunderstanding of the air traffic controller's instructions. The use of nonstandard terminology (the word "OK") caused misinterpretation of the instructions and most likely led to the tragedy. Of course, it cannot be denied that poor visibility due to the fog was also one of the reasons that caused the disaster, but not to the same extent as linguistic obscurity [1, 5, 6].

As a result, flight accidents that have happened throughout the history of aviation led to the adoption of certain standards and norms. World international organizations have made large-scale international standardization reforms to eliminate ambiguity in communication between pilots and air traffic controllers. The International Civil Aviation Organization has put forward a mandatory requirement that all aviation field specialists speak English in order to avoid confusion and misunderstanding to ensure a safe environment while providing international flights. Deviations from the use of standard phraseology are considered to be one of the serious causes of safety occurrences [5].

As it is generally known, the aviation branch is one of the fastest-developing areas of international transportation. The issues of safety improvement are being discussed by experts to reduce the number of accidents. As shown by a lot of studies in this area (the present one, in particular), human error can lead to fatal consequences. To reduce the number of air accidents, an aviation field specialist must possess a considerable wealth of knowledge, be proficient in the English language, and understand the role of the human factor in the sphere of aviation.

However, proficiency in English is just a small part of the professional abilities and skills of aircrew, air traffic controllers, and other specialists in the aviation field. A lack of proficiency in a foreign language can cause multiple problems and misunderstandings between the abovementioned specialists, which means that communication in English is one of the key factors in providing air safety.

It is worth noting that the human factor is directly connected with everyone, whether these are mechanical errors, high information technology errors, or language errors. Thus, the investigations of the role of human factors in aviation have been necessary for many years and will not lose their relevancy in the future. However, human beings are not machines, thus errors will occur, but, by understanding the root causes of human error and realizing the importance of human factors in aviation, they can be brought down to a minimum amount and their negative consequences can be limited.

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