

Awareness of phraseology as a key safety factor in the aviation environment

The article is devoted to the issue of threat of accidents caused by misunderstanding of phraseology in aviation industry and English language training of specialists to prevent this problem. The need to form an awareness of phraseology applying three following stages: Exposure, Study and Activation is emphasized in this paper.

The importance of the study has evoked the growing number of international flights with the participation of Ukraine and accidents which occurred because of human factors all over the world. In order to avoid misunderstanding in communication with the participation of Ukrainian pilots and air-traffic controllers it is appropriate to draw conclusions from these communication errors, i.e. to form awareness of phraseology in the process of training specialists for aviation industry. Phraseology as a component of Aviation English was researched. But the aspect of phraseology awareness hasn't been studied.

Ukrainian researchers have contributed to the problem of improving English language training in aviation context. Significant contribution to the study of radiotelephony phraseology and plain English was made in pedagogical direction by O. Petrashchuk [1], N. Pazyura [2], O. Kovtun [3, 4], T. Tarnavska [5], N. Glushanytsia [6]. Based on data (phraseology forms about 81% of the radiotelephony language discourse and 19% of the discourse belong to plain English language) [7], provides maximum clarity, briefness and unambiguity in communications in the aviation environment we find that awareness of phraseology is vital. We agree with T. Katerinakis, who believes that understanding of communication errors in vocalization or content can improve flight safety [8].

Despite the difficult situation in Ukraine, as long as the number of airports having international traffic has decreased, the number of international flights is increasing. For clarity, a list of international airports in Ukraine is represented by such groups: **operating airports** (Boryspil International Airport, Kyiv (Zhuliany – Igor Sikorsky) International Airport, Kryvyi Rih International Airport, Dnipro (Dnipropetrovsk) International Airport, Ivano-Frankivsk International Airport, Lviv Danylo Halytskyi International Airport, Cherkasy International Airport, Chernivtsi International Airport, Odessa International Airport, Ternopil International Airport, Zaporizhia International Airport, Kharkiv International Airport, Rivne International Airport, Uzhorod International Airport), **destroyed airports** (Donetsk International Airport, Luhansk International Airport) and **occupied airports** (Simferopol International Airport, Belbek Sevastopol International Airport) [9].

As the list shows, there are only 14 operating international airports from 18 ones in Ukraine. However, an increase in the number of international traffic and growth of international commercial flights have been observed according to statistics [10].

Three accidents in which flight safety has been disturbed because of human factors will be examined.

Accident 1. *“Burbank assigned me a squawk code. Several minutes later the Controller asked me my altitude and I responded 7,500 feet. He told me to squawk my altitude. I replied, “Squawking 7500”, and the Controller confirmed my code... After landing, Ground directed me to a specific parking area, and I was immediately surrounded by three police cars with a number of officers pointing their weapons at me... They frisked me and handcuffed me. They really roughed me up... I would suggest that Controllers never use the terminology “squawk your altitude” (# 147865) [11].*

In this accident, flight safety was disturbed due to the pilot’s lack of knowledge in that “Squawking 7500” is the emergency transponder squawk code, that means “hijacking”. “Code 7500 will never be assigned by ATC without prior notification from the pilot that his aircraft is being subjected to unlawful interference. The pilot should refuse the assignment of Code 7500 in any other situation and inform the controller accordingly... Code 7500 will trigger the special emergency indicator in all radar ATC facilities ” [12].

Accident 2. On 05 January 2018 Two Boeing 737-800 aircrafts with 168 passengers and 7 crew members were involved in a collision on the ground at Toronto-Pearson International Airport, Canada. Among probable cause it is mentioned that the Greater Toronto Airports Authority (GTAA) apron radio officer used inadequate phraseology [13]. *“The tow vehicle operator radioed the GTAA Apron Management Unit (AMU) and requested permission to push the Sunwing aircraft back. The AMU north apron radio officer informed the tow vehicle operator to “push back at your discretion,” after which the tow vehicle operator began the pushback procedure. At this time, there were no other ground personnel, such as wing walkers, in the area. At 1816:31, the Sunwing aircraft’s tail collided with the stationary WestJet aircraft’s right wing...” [14].*

The phrase “push back at your discretion” is not consistent with GTAA AMU procedures”. “At your discretion” is frequently used for helicopters and seaplanes in uncontrolled areas of an airport. Pilots are responsible for safety and separation. “ATC has given you the instruction with the intent that you comply as soon as safely able and may be instructing surrounding traffic based on this assumption” [15]. In this accident if the pilot had aware of this specific meaning he could have avoided collision.

Accident 3. *“A transcript of cockpit communication leading to the 1990 crash of Avianca flight 52 in New York revealed the pilot did not declare an emergency situation when he reported being low on fuel”. It was reported “running out of fuel” instead of signalling an emergency situation with the words “Mayday” or another international distress signal “Pan Pan” [16]. In the context of controller-pilot communications there is a specific prescribed phraseology for the declaration of an emergency accordingly unfortunately the statement “we’re running out of fuel” wasn’t interpreted as such.*

Thus, to ensure the safety of flights in civil aviation, a clear understanding and knowledge of phraseology for all staff in the aviation environment is needed.

Likewise statistics show incidents, bust events and runway incursions in aviation environment due to human mistakes, related with call sign confusion, language, the usage of standard phraseology, the complexity of the communication process and technical failure of the communication system itself [17], i.e. ineffective communication.

L. Rifkind notes that "communication is a dynamic and irreversible process by which we engage and interpret messages within a given situation or context, and it reveals the dynamic nature of relationships and organizations" [18]. Communication is based on the use of language. Effective communication implies: "the crew needs to convey information, communicate to issue orders, acknowledge commands, conduct briefings, execute callouts, and ask questions" [19].

In order to improve flight safety, ICAO has strengthened English language proficiency requirements (to be able to communicate proficiently using both ICAO phraseology and plain English) for air traffic controllers and pilots [20, P. 3-5–3-6]. As English language proficiency plays a vital role for ensuring security in the aviation environment researches, teachers and experts are looking for new approaches, methods and procedures aimed at improving the process of foreign language acquirement.

Awareness of phraseology can be considered in two aspects such as familiarity and realization. The first aspect means close acquaintance with phraseology or possession of extensive knowledge about phraseology. The second one implies the way in which phraseology is used in communication on a particular occasion, i.e. understanding of its meaning in a specific situation and an ability to apply it adequately.

We believe that awareness of phraseology can be formed by applying three following stages: Exposure, Study and Activation [1]. At the Exposure stage to new input which consists of portions of air traffic control knowledge (e.g., emergency descend), students are introduced to accidents caused by misunderstanding of phraseology. This stage provides students' acquaintance with meaning of phraseology related to new input. For assimilating new phraseology it is needed trained students through variety of activities at the Study stage and the Activation one so they can know, understand and realize new phraseology in the right context.

Conclusion

Presented accidents in the paper as examples of misunderstanding of phraseology, namely, "*squawking 7500*", "*push back at your discretion*" and "*running out of fuel*" put at threat human lives massively. Well-formed awareness of phraseology of specialists of aviation industry intended for maximum clarity, briefness and unambiguity in communications could ensure future flight safety. Exposure, Study and Activation stages provide training of awareness of phraseology with the ability to understand and use it in the right context. As English language proficiency includes ICAO phraseology and plain English, language mastering of plain English must be trained together with phraseology.

References

1. Petrashchuk, O. Integrated approach to language training of air traffic controllers [Електронний ресурс]. – Режим доступу: <http://jrnl.nau.edu.ua/index.php/visnik/article/viewFile/6699/7478>
2. Pazyura, N. Main Aspects in Language Training of Non-English Speaking Airmen / N. Pazyura // Proceedings of the National aviation university. – 2016. – № 4. – С. 114–120.
3. Kovtun, O. Communicative approach to aviation English teaching / O. Kovtun, A. Gudmanian, G. Simoncini // Safety in aviation and space technologies: the seventh world congress “Aviation in the XXI-st century”, September 19-21, 2016. – pp. 9.4–9.7.
4. Kovtun, O. Context approach in the language education of pilots and air traffic controllers // Safety in aviation and space technologies: the fifth world congress “Aviation in the XXI-st century”, September 25-27, 2012. – Volume 3. – pp. 8.1.47–8.1.50.
5. Тарнавская Т. Методы обучения будущих авиадиспетчеров профессиональному английскому языку [Електронний ресурс]. – Режим доступу: http://novyn.kpi.ua/2007-2-1/09_Tarnaskaya.pdf
6. Glushanytsia, N. Criteria, indices and levels of foreign language professionally-communicative competence formation of future bachelors in avionics in the process of their professional training / N. Glushanytsia // Sborník z konference Trendy Ve Vzdělávání 2013. – Olomouc : Pedagogická fakulta Univerzity Palackého, 2013. – St. 440–444.
7. Vasyukevich, O. PhD Thesis. Pedagogical Conditions to Develop Language Related Professional Competency of ATCOs (ab-initio) during Simulator Training (ongoing research).
8. Katerinakis, T. Communication in Flights under Crisis: A Conversation Analysis Approach of Pilot- ATC Discourse in Greece and USA [Електронний ресурс]. – Режим доступу: <http://www.lse.ac.uk/europeanInstitute/research/hellenicObservatory/CMS%20pdf/Events/2011-5th%20PhD%20Symposium/Katerinakis-Aviation.pdf>
9. List of airports in Ukraine [Електронний ресурс]. – Режим доступу: https://en.wikipedia.org/wiki/List_of_airports_in_Ukraine
10. ДАСУ – Державна авіаційна служба України, (2018). Оперативна інформація [Електронний ресурс]. – Режим доступу: <https://avia.gov.ua/pro-nas/statistika/operativna-informatsiya>
11. Matchette, R. Non-standard phraseology incidents [Електронний ресурс]. – Режим доступу: https://asrs.arc.nasa.gov/publications/directline/dl7_say.htm
12. Aeronautical Information Manual Study Guide For The Private Pilot. Aviation study made easy system... – Elite Aviation Solutions, 2013. – 416 p.
13. Aviation Safety Network [Електронний ресурс]. – Режим доступу: <https://aviation-safety.net/database/record.php?id=20180105-0>
14. Air Transportation Safety Investigation Report A18O0002 [Електронний ресурс]. – Режим доступу: https://reports.aviation-safety.net/2018/20180105-0_B738_C-FDDB--B738_C-FPRP.pdf

15. Phraseology [Электронный ресурс]. – Режим доступа: <https://www.navcanada.ca/EN/media/Publications/VFR%20Phraseology.pdf>
16. Fatal consequences of miscommunication between pilots and air traffic controllers [Электронный ресурс]. – Режим доступа: <https://www.smh.com.au/business/workplace/the-fatal-consequences-of-miscommunication-between-pilots-and-air-traffic-controllers-20160928-grq1d9.html>
17. Isaac, A. Effective communication in the aviation environment: work in progress <https://skybrary.aero/bookshelf/books/83.pdf> [Электронный ресурс]. – Режим доступа: <https://skybrary.aero/bookshelf/books/83.pdf>
18. Rifkind, L. Chapter 13. Communication [Электронный ресурс]. – Режим доступа: https://www.faa.gov/about/initiatives/maintenance_hf/library/documents/media/human_factors_maintenance/human_factors_guide_for_aviation_maintenance_-_chapter_13.communication.pdf
19. Krivonos, P. D. Communication in aviation safety: lessons learned and lessons required [Электронный ресурс]. – Режим доступа: https://asasi.org/papers/2007/Communication_in_Aviation_Safety_Paul_Krivonos.pdf
20. Manual on the Implementation of ICAO Language Proficiency Requirements. Doc 9835 AN/453. 2nd ed. – Montreal : ICAO, 2010. – 150 p.