

ON THE IMPORTANCE OF CIVIL AVIATION STAFF'S AUDITORY COMPETENCE IN THE CONTEX OF FLIGHT SAFETY

ПРО ВАЖЛИВІСТЬ АУДІО КОМПЕТЕНТНОСТІ ПЕРСОНАЛУ ЦИВІЛЬНОЇ АВІАЦІЇ У КОНТЕКСТІ БЕЗПЕКИ ПОЛЬОТІВ

The current increase in international air traffic volumes implies the improvement of air navigation equipment and procedures. With reference to "Ground-to-Air" radio exchange, a specific type of communication characterized by distinctive psychological characteristics as well as professionally relevant radio communication skills are of top priority in view of flight safety issues. Despite a significant amount of research into the problems related to sublanguages that can be used by civil aviation staff in radio exchange, it should be admitted that the features of a radio communication sublanguage, that can provide most effective communication between a pilot and an air traffic controller, remain the least studied. Given the fact that the use of English as an international language of civil aviation has become widespread, with radio communications in national languages meeting international standards, there is a real need for a comparative study of radio communications in both the English language and national languages, since typological analysis is important for radio unification. The ongoing process of updating the existing forms of radio exchange leads to the emergence of new sections of radiotelephone phraseology. High-quality professional language training of radio exchange participants has become a guarantee of air traffic safety, especially for non-native English participants.

The article covers the issues of importance of developing strong auditory competence along with the relevance of aural comprehension skills in civil aviation staff, since auditory competence is a mandatory component of their professional activities. Clear, unambiguous understanding of the radio exchange language is of crucial importance to the effective "Pilot – Air Traffic Controller" communications. It is obligatory that a pilot confirm each piece of information, received from an air traffic controller through radio exchange, using the appropriate aircraft call sign. The efficiency of radio exchange is influenced by many factors. As non-standard phraseology may cause airborne accidents and incidents, civil aviation staff's auditory competence based on the profound knowledge of professional radiotelephone phraseology does directly affect the flight safety.

Auditory competence guarantees smooth communication, which helps achieve the desired result with least time and effort; reduces the risk of misunderstanding the information received; and facilitates the process of double checking the information so that possible errors can be instantaneously detected and eliminated. The article considers theoretical basis for the development of methods for teaching auditory comprehension to cadets at aviation universities, which implies preliminary training of students' phonemic hearing to the perception of reference phrases typical of "Ground-to-Air" radio communication. A complex of exercises has been suggested to train phonemic hearing, which is regarded as a necessary precondition for high-quality perception of audio messages.

Key words: auditory competence, radio communication, aural comprehension, flight safety, radio exchange, sublanguage, radiotelephone phraseology, phonemic hearing.

Поточне збільшення обсягів міжнародного повітряного руху передбачає вдосконалення

аеронавігаційного обладнання та процедур. Радіообмін «земля-повітря» є специфічним типом комунікації, що характеризується певними психологічними особливостями, а також передбачає професійно відповідні навички радіозв'язку, володіння якими є надзвичайно важливим для забезпечення безпеки польотів. Незважаючи на значний обсяг досліджень, пов'язаних з субмовою радіообміну, що використовується співробітниками цивільної авіації, слід визнати, що її особливості, які можуть забезпечити найбільш ефективний зв'язок між пілотом та диспетчером повітряного руху, досі залишаються найменш вивченими. Враховуючи поширення використання англійської мови як міжнародної мови цивільної авіації та необхідність відповідності мови радіозв'язку міжнародним стандартам, існує реальна потреба у порівняльному дослідженні субмови радіозв'язку в англійській та національних мовах, оскільки типологічний аналіз важливий для уніфікації радіообміну. Постійний процес оновлення існуючих форм радіообміну призводить до появи нових розділів радіотелефонної фразеології. Якісна професійна мовна підготовка учасників радіообміну стала запорукою безпеки повітряного руху, особливо для учасників, які не є носіями англійської мови.

У статті розглянуто важливість формування компетенції сприйняття та розуміння на слух та набуття відповідних навичок у співробітників цивільної авіації, оскільки аудіо компетентність є обов'язковою складовою їх професійної діяльності. Чітке, недовозначне розуміння мови радіообміну має вирішальне значення для ефективного зв'язку «пілот – диспетчер повітряного руху». Кожну інформацію, отриману від авіадиспетчера у процесі радіообміну, пілот обов'язково підтверджує відповідним авіаційним позивним сигналом. Ефективність радіообміну залежить від багатьох факторів. Оскільки нестандартна фразеологія може спричинити авіаційні аварії та інциденти, аудіо компетентність персоналу цивільної авіації, що ґрунтується на досконалому знанні професійної фразеології радіообміну, безпосередньо впливає на безпеку польотів.

Аудіо компетенція гарантує безперервне спілкування, що допомагає досягти бажаного результату з мінімальними витратами часу та зусиль; знижує ризик неправильного розуміння отриманої інформації; та полегшує процес повторної перевірки інформації, для миттєвого виявлення та усунення можливих помилок. У статті розглядаються теоретичні основи розробки методики навчання курсантів авіаційних вузів аудіювання, що передбачає попереднє тренування фонематичного слуху студентів до сприйняття базової фразеології, характерної для радіозв'язку «земля-повітря». Запропоновано комплекс вправ для розвитку фонематичного слуху, який розглядається як необхідна передумова якісного сприйняття звукових повідомлень.

Ключові слова: аудіо компетенція, радіозв'язок, розуміння на слух, безпека польотів, радіообмін, субмова, фразеологія радіообміну, фонематичний слух.

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General Statement. The issue of training highly-qualified specialists in the area of ATC has always been prioritized. Currently, amid fast growing economies of the globalized world it is gaining more significance than ever before. All the considerations taken into account, the English language competence level recommended by the International Civil Aviation Organisation (ICAO) is high enough. With the requirements to flight safety in mind, learning English with the purpose of achieving high proficiency levels has become of prior importance for civil aviation staff, especially those pilots and air traffic controllers working for international airlines.

Living in the era of the constantly changing world of the Internet and the speeds of lightning, it is often within seconds that we have to come up with important decisions. When such decisions are to be made in a foreign language, one can hardly find a dictionary or some reference books at hand. Therefore, flight safety can be provided on the condition that civil aviation staff have high proficiency in the English language as an international language of radiotelephone communication.

Analysis of the Latest Research and Publications. Sadly, but the fact remains that in recent years the world has seen a number of air borne accidents. One of the reasons behind these events was aviation staff's insufficient knowledge of English as an international language of radio communication [1-5]. On November 27, 2003 ICAO adopted Amendment #164 «On the Issuance of Certificates to Aviation Personnel» to Statement 1 (clauses 1, 2, 4 and 9), according to which aircraft and helicopter pilots, air traffic controllers and aeronautical station operators must clearly understand the professional language of the radio exchange, being able to competently use it at the working level [3]. This amendment came into effect on March 5, 2008.

Developing aural comprehension skills has always played a pivotal role in both Ukrainian and foreign methodologies of teaching foreign languages. This approach to language teaching techniques can be supported by the opinion that of the numerous aspects of activities involving communication in a foreign language it is aural comprehension that may turn out to be most challenging. Thus, the importance of possessing good aural comprehension skills can hardly be overestimated.

When analyzing publications on pedagogy, psychology and teaching techniques, it should be noted that a number of scientists such as B.A. Dushkov, I.M. Ivanova, Z.A. Kochkina, N.S. Kharlamova, B.A. Lapidus, N.Yu. Abramivska, S.N. Stepanova, M.Z. Shyshlo and others did research into the issues of possible challenges university students may have when communicating with native speakers. Many authors highlight such aspects as interdependence between the ability to understand a spoken foreign

language and the peculiarities of the text you hear, one of them being the way the information is presented (A.S. Lurii, Ye.G. Bogdanova, J. Miller), which contributes to the development of aural comprehension skills during audio sessions (N.I. Gez, Z.A. Kochkina).

The research into the influence the tempo of speech can have on aural comprehension skills was conducted by G. Feierbank, N. Gutman and S. Miron in 1957. At the same time, the issues of training aural comprehension skills, that are needed for radiotelephone communication in hazardous conditions, in « Ground-to-Air » radio exchange in particular, are still to be studied more thoroughly.

The Purpose of the Article is to point out the fact that the level of the language competence cadets have does not fully meet the requirements set by the Standards. This fact can be proven by the upsetting air borne accidents statistics. For this particular reason, there arises the need for the effective methods of training oral comprehension skills in future air traffic controllers to be developed. In view of flight safety issues, these training methods are growing increasingly important for the efficacy of the professional radio communication.

The Main Idea. Along with knowledge in general disciplines and disciplines for specific purposes, students at higher aviation educational establishments are also trained to communicate in English to gain competence in « Ground-to-Air » radio exchange. Aviation English is taught as a foreign language for specific purposes, which is intended for those specialists involved in the aviation industry. Aviation English is routinely used in meteorological support of flights, aircraft building, air traffic management and other associated activities. Radiotelephone phraseology makes up the bulk of Aviation English. When considered through the prism of linguistics, Aviation English can be classified as a sublanguage, having its own limited vocabulary and pronunciation rules. Aviation English has been specially designed to give unambiguous interpretations of data used by pilots and air traffic controllers. The distinguishing feature of this language is strict regulation of radiotelephone phraseology, whose task is to determine a particular situation by means of particular words, with no deviations or variations acceptable [2-4]. It is this strict regulation that makes complete mutual understanding between all the participants of radiotelephone communication possible on a global scope. ICAO phraseology can be described as a relatively small rigidly structured part of the language, a set of standard words and phrases approved by ICAO which are intended for communication in «Pilot-Air Traffic Controller» mode [5, 6, 7].

Being an international language since 1951, English has become mandatory for the use by aviation professionals in accordance with the ICAO directives.

The focus is primarily made on the appropriate pronunciation and auditory comprehension skills, with no deviations from the set standards acceptable. However, according to some reports, communication between air traffic controllers and pilots is seen to be a particular problem in the airspace due to the various accents of the English language aviation staff may have [5-8]. The statistics of major airborne accidents and disasters in the world shows that the main factor behind all the catastrophies is the human factor, caused by misunderstanding by either the crew staff or ground staff [1].

Since a pilot or an air traffic controller has no right to make a mistake when conducting Ground-to-Air radio exchange, the ability of cadets to adequately understand communicative foreign speech is becoming increasingly important. In this regard, training aural comprehension skills remains one of the major academic tasks in aviation universities.

Flight safety directly depends on how well the pilots and air traffic controllers conduct radiotelephone communication in English. Therefore, as a result of studying the discipline, cadets must master skills and develop abilities of professional radio exchange, which is mainly about being able to instantly and accurately understand the transmitted information as well as to quickly respond to the message. These goals can be achieved provided cadets are constantly trained to comprehend a foreign language used for professional purposes, with the whole process of training being time-consuming. Therefore, the importance of teaching multilingual aviation professionals to both accurately understand information and deliver the message is absolutely unquestionable [6-8].

There is no doubt that radio exchange is a specific type of communicative activity, which is characterized by particular psychological features, which are professionally important skills necessary for successful professional radio communication between aircraft crews and ground aviation authorities [9, 10]. It has been found out that in the conditions of professional radio exchange the following psychophysiological mechanisms prove to be the key factor: speech-motor automatism; comprehension mechanisms; mnemonic mechanisms; speech segmentation and anticipation mechanisms. Auditory comprehension occupies a special place in the system of listening mechanisms.

The traditional communication model includes a sender of information, a channel through which the information is delivered and an information receiver. Both speaker and listener participate in this phase of communication. The speaker encodes the intended meaning in a spoken utterance. The utterance is transmitted over the corresponding channel in the form of an audio stream, which is perceived and decoded by the listener. The listener's presentation of the meaning of the utterance in case of successful

communication will fully or almost ideally correspond to the intended meaning of the speaker [2, c. 2-3].

However, it should be noted that this unidirectional model of spoken communication needs to be developed to accommodate a two-level, multi-level relationship between the speaker and the listener, more accurately reflecting the process of an oral dialogue. These include the speaker's initial and current perception of the listener, the listener's expectations of the content of the message, and the listener's ability to provide feedback (feedback channel) informing the speaker how well they understood the message. In addition, the model consisting of an ideal speaker, an ideal information channel and an ideal listener, does not include such accidental interferences to communication such as interruptions of attention or background noise. Apparently, the speaker's ability to encode messages and the listener's ability to decode them will be critical to successful communication. All this belongs to the sphere of linguistic competence.

Listening, being a receptive type of speech activity, is defined as a process consisting of the simultaneous perception of the speech form and understanding of the content of the audible message [11, c. 39, 180]. One of the complete definitions of listening seems to be the following: "Listening is a complex thought process of perception, recognition and understanding of speech, accompanied by active processing of the information received in connection with the auditor's linguistic and pragmatic experience and assessment of the perceived information in internal speech" [12, c. 38].

Given some peculiarities of training cadets at an aviation university, we consider listening as a specific type of communicative activity in terms of professional communication, which is carried out live in the process of radio communication between an air traffic controller and an aircraft pilot.

In view of what has been said above, the problem of increasing auditory competence in training aviation specialists has always been relevant in compliance with the new requirements and modern approach to the quality of teaching professionally oriented English.

Today, there has been a significant change in the approaches to aviation language training, in particular, to the definition of clear objectives presented in the ICAO language assessment scales. The determining factor in the development of the language training system for aviation specialists is the need to reach working level 4 on the ICAO qualification scale [2, c. 2-4]. That is, at the working level 4 on the ICAO scale, a person should have an emphasis that does not complicate understanding; to master grammatical constructions so that errors, if they arise suddenly, do not distort the meaning of the message; to be able to rephrase a statement if the vocabulary is not sufficient to explain; speak at a pace corresponding to the ICAO scale; understand the interlocutor, be able

to resolve doubts in the accuracy of understanding by checking, confirming or clarifying.

According to the ICAO rating scale, professional listening and speaking can be divided into the following skills.

a) Pronunciation, the main elements of which are individual sounds (phonemes) of speech, stressed and unstressed syllables, words, as well as the rhythm and intonation of sentences or expressions. Native language and regional features have a profound effect on the way messages are pronounced.

b) Grammatical competence implies the correct use of complex syntactic and grammatical constructions, such as tenses and modality. Grammar and syntax play a special role in conveying meaning and intention.

c) Vocabulary, the elements of which are words and fixed expressions consisting of several words, functional and content words related to relevant topics. The level of mastery is manifested in the accuracy, range and speed of access to the vocabulary required in a given situation. Paraphrasing skills are also related to lexical competence.

d) Fluency is a skill that refers to the ability to speak at an appropriate pace, which increases as the level of language proficiency increases.

e) Comprehension is related to the development of the ability to recognize and understand speech, which eliminates difficulties when dealing with unfamiliar topics, accents or speech patterns, as well as with adverse reception conditions (due to background noise, etc.).

f) The skill of interaction is aimed at the ability to successfully participate in a spontaneous dialogue, which allows the interlocutor to keep the conversation going. This skill is manifested by the speed and relevance of answers, the ability to convey new information, initiative in conversation, responding to the speech of the interlocutor, as well as the ability to resolve misunderstandings as they arise [3, c. 2-4 – 2-5].

In the process of interaction between pilots and controllers, both parties must verify, confirm and clarify the information received. Their pronunciation must be absolutely clear and legible to be understood by the international aviation community in the event of an emergency.

However, the quality of the language training of aviation specialists determines the relevance of developing an effective methodology for training future air traffic controllers in compliance with the ICAO requirements to the ICAO Aviation Personnel Licensing Rules, according to which aircraft and helicopter pilots, air traffic controllers and air operators must be highly qualified in radio communication.

Experience shows that cadets may have major difficulties when it comes to the perception of radiotelephone phraseology, for their aural comprehension skills are far from being desired.

Success in learning a foreign language, namely auditory competence, is largely determined by the development of phonemic listening. Without this, communication process cannot take place because of the difficulties associated with message interpretation. In this regard, N.I. Gez emphasizes that "the success of semantic perception largely depends on the listener's ability to distinguish sounds, sound combinations, speech patterns and remember their acoustic qualities, that is on the formation of speech hearing – intonation and phonemics" [13, c. 32].

Therefore, building up phonemic awareness is gaining prior importance. The conclusion we can come to is that the academic literature intended for aviation specialists must necessarily include a system of exercises aimed at training phonemic awareness.

The analysis of radio exchange made it possible to identify specific problems with listening to radiotelephone phraseology. In addition to standard difficulties (phonetic, lexical and grammatical), there are difficulties of an objective nature (perception of distance, simultaneity and inability to comment on radio messages, man-made interference) and difficulties of a subjective nature (individual accents, originality and speed of pronunciation, cultural inconsistencies).

Thus, as a theoretical basis for the development of methods for teaching auditory comprehension to cadets at aviation universities, a provision on preliminary training of students' phonemic hearing has been adopted to focus and adapt students' hearing to the perception of reference phrases that are the main content of "Ground-to-Air" radio communication. Such organization of the learning process leads to change in the methodology. What makes it principally different is a combination of exercises to form the basic mechanisms of phonemic hearing, which implies differentiation and recognition of speech patterns.

Therefore, we consider the development of phonemic hearing as a necessary precondition for high-quality perception of audio messages, as it provides and implements all the necessary psychophysiological mechanisms of perception.

A complex of exercises designed to train phonemic hearing, is aimed at the developing of the ability to comprehend a foreign language, reproduce the word in its sound integrity, perform both component and verbal analyses, differentiate lexical units in conditions of external interference, reproduce semantic syntagmas and individual phrases preserving their original intonation pattern. Such training includes five series of exercises. The first series is aimed at identifying sounds. The second series trains to recognize the sound build of the word. The third series is designed to develop the ability to recognize the structural build of the word. The fourth series is aimed at identifying separate words by ear

as well as word-combinations and phrases by tone of voice. The fifth series includes exercises that train to distinguish between language structures.

The second complex of exercises, designed to promote cadets' listening skills, develops their aural comprehension abilities, contributes to their aural understanding of commands, reports and requests given, as well as identification and differentiation of standard radio communication phraseology. As a result of practicing this complex of exercises, the following skills are formed:

- distinguishing phenomena expressed by standard phraseology in certain language utterances;
- correlation of sound images with their semantics;
- defining content meaning of different lexical units;
- recognizing the message and adequate responding to it;
- predicting possible utterances of the crew;
- filling in the gaps in the messages by logical guessing based on the context in conditions of technical failures;
- perception and response (without loss of information) to the message at a normal pace and full playback;
- ability to respond to messages in normal and extreme flight conditions;
- ability to conduct radio communication effectively in standard and extreme flight situations simulated closely to real;
- ability to conduct radio communication at a high professional level both in standard and non-standard or extreme situations.

The purpose of a set of exercises described above is mainly to train cadets' phonemic hearing, as a precondition for effective listening, which means mastering skills to perceive and recognize individual sounds in words, differentiate syllables in words, distinguish individual features of different voices. Such training complex develops students' ability to analyze and synthesize words by ear, distinguish stressed syllables in words, determine the number of words in a phrase and recognize sentences with different intonation in the process of communication. It is likely that after doing exercises aimed at training phonemic hearing, cadets will be more effective in mastering radio communication phraseology.

Conclusion. Comprehending radiotelephone phraseology in "Ground-to-Air" communication is a specific type of communicative activity implemented on a strictly regulated basis of radio exchange phraseology. Radio communication with the use of radiotelephone phraseology is the activity of the highest category of complexity, as it occurs in psychologically stressful environment complicated by

hazardous conditions, such as distance and one-way communication; man-made noise and meteorological interference; multifunctional nature of air traffic controller's activity; tough radio communication time frames, etc. Objective and subjective complexity of radio communication has led to the development of a new method of teaching aural comprehension of radiotelephone phraseology, based on training phonemic hearing as a precondition for a successful perception of radiotelephone phraseology.

REFERENCES:

1. ASN Aviation Safety Database. URL: <https://aviationsafety.net/database/record.php?id=19770327-0>
2. Manual on the Implementation of ICAO Language Proficiency Requirements. Doc 9835. Second Edition. International Civil Aviation Organization. 2010. 180 p.
3. Language proficiency requirements for licence holders URL: <https://www.icao.int/safety/airnavigation/pages/peltrgfaq.aspx>
4. Руководство по радиотелефонной связи: Дос 9432 AN / 925. изд. 4-е. Монреаль: Международная организация гражданской авиации, 2007. – 134 с.
5. Alderson J.C. Air Safety, language assessment policy, and policy implementation: The case of Aviation English. Annual Review of Applied Linguistics. 2009. Vol.29.P.168-187.
6. Akmal'dinova O.M., Budko L.V., Shulga T.V. Competence based approach to teaching professional English in training aviation specialists: *Aviation in the XXI-st century the 8th World Congress, October 10-12, 2018*. Kyiv, 2018. – P.13.1.38-13.1.40.
7. Maksymovych G.O., Shulga T.V., Yurchenko S.O. Language competence as an underlying factor of flight safety culture. *Інноваційна педагогіка*. 2021. Вип. 35. С. 34-39.
8. Kerns S.K. Teaching to competence: myths and solutions. ICAO Training Report. 2017. Vol.7.P. 7-9.
9. Тарнавська Т. В. Методика навчання майбутніх диспетчерів керуванню повітряним рухом в екстремальних ситуаціях на міжнародних повітряних трасах : дис. ... канд. пед. наук : 13.00.02 . Харків, 2008. 240 с.
10. Тарнавская Т. В. Анализ авиационных происшествий и инцидентов в процессе обучения будущих диспетчеров УВД на МВТ. *Гуманітарні проблеми становлення сучасного фахівця : VIII Міжнар. науково-практ. конференція*. Київ, 2007 р. С. 281–282.
11. Глухов Б.А., Щукин А.Н. Термины методики преподавания русского языка как иностранного : [Словарь]. *Русский язык*. Москва, 1993. 369 с.
12. Суздалёва Е.С. Формирование умений аудирования лекций медико-биологического профиля при обучении студентов-иностранцев на среднем этапе : дис. ... канд. пед. наук : 13.00.02. Москва, 1998. 297 с.
13. Гез Н.И. К вопросу об обучении распознаванию речи при зрительном и слуховом восприятии. *Иностранные языки в школе*. 1962. № 2. С. 32.