
LANGUAGE BARRIERS COMPLEXITY AND THEIR IMPLICATIONS WITH FATAL CONSEQUENCES IN AVIATION

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Abstract: This paper deals with language barriers and their direct interference in aviation accidents with fatality. The paper first gives the definition of language barriers in general, elaborating the reasons why they emerge, their intricacy and attainable solutions for minimizing them. Language cannot be isolated from culture and cultural competencies apply in principle to mutual understanding and minimize impedance and any misunderstanding. Language barriers cause many problems and nature of any communication is subject to misinterpretation and misunderstanding. The criticism given to this topic indicates that language barriers can sometimes cause misunderstandings that lead to conflict, frustration, offense and hurt feelings. Besides that, if people do not share the same language, misunderstanding might arise from language barrier complexity and people sometimes face serious consequences. Lack of communication and higher level of misunderstanding as a result of language barriers might lead to fatal consequences. Language barriers may appear even in monolingual areas as the result of complex terminology for specific scientific areas - phraseology. Miscommunication is viewed as one of the most frequent forms of error, whether made by one person or more, the repercussions can be catastrophic. Planes are the safest means of transportation, however, when a plane accident happens, fatal consequences are inevitable. Miscommunication between pilots and air traffic controllers produced by language barriers is considered as the major reason for many aviation accidents. The globalization of aviation is leading to a multicultural, multinational mix of crews. When different cultures and nationalities are obliged to work together, various miscommunications can arise. With differing ethnic and national backgrounds, pilots' communicative styles also differ. Language barriers between pilots and air traffic controllers lead to deaths, experts say. English for the purpose of aviation was adopted as the international language of pilots and air traffic controllers in 2011, language barriers still cause many problems, impede any progress or halt it. Lack of effective communication between the members of the flight crew restricts the flow of safety-critical information, information which could prevent the occurrence of an aviation accident or incident. The paper also clarifies judgment and demeanor of several experts who have done some research covering the topic of aviation accidents and their possible solutions for minimizing language barriers that, despite modern technology, still play a significant role in fatality.

Keywords: language barriers, miscommunication, aviation, impedance, fatality.

1. INTRODUCTION

Communication can be defined as the process of transmitting information and common understanding from one person to another (Keyton, 2011). The sender, as one side of communication, has a role of an initiator. There is a difference between talking and communicating. *"Constantly talking isn't necessarily communicating"* - Charlie Kaufman

Communication is the verbal and nonverbal exchange of information that requires a response, interaction between two individuals and it serves a higher purpose. In this process we clarify judgments and decisions we have made and have the ability to perceive other people's needs, expectations and judgments. On other hand, talking is simply the process of delivering the information without expecting the response. Communication problems occur numerous times every day and people encounter language barriers whether in research, government, business or aviation. Even in informal speech, when language barriers appear, ordinary people can be hurt, take something as offensive and it is not a rare case that it leads to violence. A lack of attention in communication can cause significant impediment. However, language barriers can be dangerous when they are in the form of fatality, which means that in some jobs individuals are strongly forbidden to experience language barriers due to fatal consequences, yet we witness these situations in the most alarming way. Language barriers in the form of fatality require more serious approach to researches in some professions.

1.1. Definition of language barriers

Why do we face language barriers? Language barrier to communication is the inability to communicate using a language. Language barriers impede effective communication and they are the most common barrier toward

communication. They cause misunderstandings and misinterpretations between people. There are numerous types of barriers and some of them are more closely related to language barriers:

- Physical barriers include difficult terrain, high levels of security, the distance between people or inaccessible locations and they tend to create a psychological barrier when a person, due to a physical barrier, begins to feel less comfortable and is not able to deliver the message;
- Emotional barriers are also impedances to effective communication, representing mental walls that keep us from openly transferring our thoughts and feelings to others. Individuals with emotional barriers tend to be extremely reserved, cautious, and insecure. As a result, they may find it challenging to effectively express themselves – whether it is through their work or through interpersonal communication. (<http://letslive.info/emotional-barriers/>);
- Cultural barrier closely relates to language barrier. In business which requires working at global level, it is crucial to understand certain cultural values and customs of nations we are working with. Overcoming this barrier encourages us to make one step forward in expanding business

The crew might not be cooperative due to language barriers, whether this problem is a result of physical barriers (communication between pilots and first officers on one side and controllers on the other), emotional barriers (an emergency case occurs during the flight and the crew might feel the obstacle to communicate being under pressure due to fear or panic) or cultural barriers (the crew consists of different ethnic groups with different cultural background and find it difficult to feel communicative connection). The flight crew whose first language is not English finds it much more demanding and difficult to communicate in English, as aviation contains its own terminology. Apart from that, their job description sometimes dictates the situation forcing them to work under pressure as is the case during an emergency. In these circumstances, whether intentionally or unintentionally, speakers have tendency to rely on their first language. When under stress, a requirement is sometimes that a speaker has a high proficiency and control to have an ongoing process of communication in a non-native language (English). Even then, some grammatical or lexical features may arise that are only consistent with the native speakers and the other pilots, being non-native speakers, find it difficult to understand. This impediment usually leads to miscommunication and is a threat to safety.

2. MISCOMMUNICATION - THE OUTCOME OF LANGUAGE BARRIERS

Language barriers, whether in ordinary lives or in professions, lead to miscommunication. In addition, miscommunication can result in catastrophic errors. Dominique Estival, a Western Sydney University linguist, pilot and flight instructor has urged native English speakers to adjust their communication in the aviation industry to reduce the risk of misunderstanding by non-English speaking pilots. Estival said she has heard pilots in Australia saying "cleared for the big smoke" when cleared for takeoff, which was potentially dangerous in a situation where they were communicating with a non-English speaker. Miscommunication has contributed to the fatality regarding plane crashes since the mid-1970s taking into account the fact that more than 2000 people have lost their lives. In her new book *Aviation English*, Estival warns that some terms commonly used have been misunderstood, with fatal consequences. Given that radio communication is the main means of communication between air traffic controllers and pilots, effective communication "is crucial for aviation safety". "The study of aviation communication sheds light on our understanding of English, and differences between native English speakers and speakers of English as a second language in high risk situations," Dr Estival said. "Effective communication is paramount in ensuring the success of the global aviation industry." Estival said an investigation of a collision between two planes in the Canary Islands in 1977 revealed that the Dutch pilot had no English proficiency, which might have contributed to the accident, making it the deadliest accident in aviation history (<https://www.stuff.co.nz/travel/travel-troubles/84903011/fatal-consequences-of-miscommunication-between-pilots-and-air-traffic-controllers>). Although there is a specific obligatory phraseology for declaring an emergency in the context of controller-pilot communications, miscommunication between pilots and air traffic controllers is considered as the major reason for many aviation accidents.

2.1. Intricacy of aviation phraseology

Obviously, within some air companies, the standard of English is pretty high, not within all of them. Different dialects, accents and languages lead to a problem, particularly beyond the minimum of ICAO requirement. In some circumstances inappropriate use of phraseologies has contributed, to an accident or incident, even fatal consequences, ICAO (The International Civil Aviation Organization) states in its manual on the implementation of ICAO Language Proficiency Requirements. "For phraseologies to have the most significant safety impact, all parties need to use the same, ICAO phraseologies," ICAO states. On 25 January 1990, the Avianca flight from Bogota, Colombia, to JFK Airport in New York, was running out of fuel in the most appalling weather conditions. After

being kept in a holding position by air traffic control (ATC) in New York, the plane's fuel tank was running dangerously low. Air traffic control was unaware of the gravity of the problem, the plane crashed just nine minutes later and out of the 158 people on board, 73 died, including the pilot and the co-pilot. "One of the factors was the failure of the pilot communicating with ATC to state the word 'emergency' or 'Mayday' explicitly," explains Elizabeth Mathews, a former linguistic consultant for the International Civil Aviation Organization (ICAO) and assistant professor at Embry-Riddle Aeronautical University (ERAU) in Florida. She states that 'emergency' means controllers should initiate a specific set of emergency procedures. For example, it can be giving priority to the aircraft in an emergency situation. For that reason the controller misunderstood the information and was not aware that they were in a fuel emergency. ICAO language standards were available at the time, yet Mathews says they were not as clear as the strengthened 2008 ICAO Language Proficiency Requirements. Since 5 March 2008, English language proficiency for pilots must be at least ICAO level 4 (tested every three years). Plain language is only to be used when "standardized phraseology cannot serve an intended transmission" (<https://www.airport-technology.com/features/role-language-air-accidents/>).

2.2. Fatality caused by language barriers in aviation

A language barrier is the lack of a common language that prevents a sender to transfer the information and a receiver to receive it through verbal communication. Communication is universally acknowledged to be critical to aviation safety." (<https://www.airport-technology.com/features/role-language-air-accidents/>).

Planes, as sophisticated machines, are designed to be controlled by a crew that collaborates representing a team of equals. Elizabeth Mathews, believes that language factors have played a role – and in different ways – in more accidents than is generally acknowledged. Language barriers have been part of aviation and one of the most famous plane crashes due to such reason happened in 1996 near the capital of India between Saudi Arabian Airlines Boeing 747-100B and Kazakhstan Airlines Illyushin II-76 from Chimkent. Both flights were controlled by VK Dutta. Saudi Arabian Airlines departed from Delhi International Airport and Kazakhstan Airlines was descending to Delhi airport at the same time. Eight minutes later the KZA1907's tail cut through SVA763's left wing. The collision was fatal to all 312 people on board SVA763 and all 37 people on KZA1907. This plane crash, with extreme fatality, was investigated by the Lahoti Commission, headed by then-Delhi High Court judge Ramesh Chandra Lahoti. The flight data recorders were decoded by Kazakhstan Airlines and Saudi Airlines under the supervision of air crash investigators in Moscow and Farnborough, England, respectively ([https://simple.wikipedia.org/wiki/Charkhi Dadri mid-air collision](https://simple.wikipedia.org/wiki/Charkhi_Dadri_mid-air_collision)).

The investigation reported that the accident had been the fault of the Kazakh II-76 commander, who had descended from the assigned altitude of 4,600 to 4,400 m and subsequently 4,300 m and even lower. The Kazakh aircraft pilots faced the language and communication problem. The investigation also showed that the radio operator for communications with the ATC gave the Kazakh pilots the right commands, however, the plane crash happened due to the lack of English language skills.

A plane crashes when lower level of communication occurs contributing to fatality:

- Tenerife Airport Disaster (1977): Dutch-speaking pilot's lack of English proficiency
- Avianca Flight 52 (1990): Did not declare an emergency when reporting it was running out of fuel, wrong use of aviation terminology
- Dan Air Flight 1008 (1980): Pilot appears to have mistaken "inbound" for "outbound" and flew in the wrong direction.
- American Airlines Flight 965 (1995): An air traffic controller's lack of English proficiency

"Not knowing the right terminology, phraseology and using the exact words can be deadly important," she said (<https://www.stuff.co.nz/travel/travel-troubles/84903011/fatal-consequences-of-miscommunication-between-pilots-and-air-traffic-controllers>).

3. EXPERTS' ATTITUDE AND APPROACH TO LANGUAGE USED IN AVIATION

The Language as a Human Factor in Aviation Safety (LHUF) was launched to heighten awareness, improve aviation safety and enhance future investigations. "While communication is universally acknowledged to be critical to aviation safety, industry understanding of communication and language as fundamental aspects of aviation safety has not kept pace with our understanding of other human performance factors," says Mathews, co-authoring a book, *English in Civil Aviation*, in which she provides a linguistic review of the American Airlines accident in Colombia on 20 December 1995 (<https://www.airport-technology.com/features/role-language-air-accidents/>). She claims that language issues, together with other human and operational factors in aviation, are not investigated thoroughly by experts, which would include accident investigators, linguists and safety experts to better consider communication and language factors.

Mathews, an applied linguist, has created databases of aircraft accidents all over the world to identify the role of communication deficiencies. From 2000 to 2013, Valdes was representative of the International Federation of Air Line Pilots' Associations to the ICAO study group. The mission was to strengthen language standards in 2003 which were adopted by the ICAO in 2008. According to Valdes in 2003 the ICAO put focus on implementing the English standards for phraseology. He worked on a project with Mathews and realized that most of the English as a Second Language pilots who are at ICAO level 4 may not be able to fully understand the English language manuals that describe in detail how to use the systems of airplanes (<https://www.airport-technology.com/features/role-language-air-accidents/>). The curriculum is the same as well as the exam whether pilots are native or non-native speakers. "Without an accurate perception of the problem, appropriate resources are not allocated, creating a growing safety gap in an increasingly multicultural industry," Mathew says.

4. HOW TO MINIMIZE LANGUAGE BARRIERS IN AVIATION

Human error continues to play a major role in aviation accidents. Unambiguous flight crew communication remains a vital element in air safety. Experts say that there are some issues to ensure appropriate communication. As the first issue, they consider that specific procedures and protocols should be implemented in order to overcome constraints and difficulties in communication between people of different backgrounds. Air traffic is increasing at global level, multicultural communications between and amongst pilots and air traffic controllers are imperative. Even when a single language is required, speakers need to avoid confusion by careful observation of standard phraseology and accurate radiotelephony techniques. The second important issue might be training, in terms of crew selection and pairing and cultural diversity awareness training. "In many cultures, deference is often given to age, rank, seniority, role, caste etc. It is therefore important for pilots (and other safety critical workers) to undertake cultural diversity awareness training, and for organizations to adopt effective strategies to reduce the associated risks" ([https://skybrary.aero/index.php/Language and Cultural Differences on the Flight Deck](https://skybrary.aero/index.php/Language_and_Cultural_Differences_on_the_Flight_Deck)).

During the obligatory line check, successful compliance with the following criteria should in turn be checked, CRM with particular reference to the two-man cockpit and the cultural norms and appropriate linguistic proficiency for the current operation. One possible solution for mitigation differential communication in the cockpit is to make co-pilots address superiors by their first name. Experts claim that by this they are more encouraged to be assertive and comfortable. Equally, they insist that captains should be less dominant and operate as organizers rather than as superiors. ([https://skybrary.aero/index.php/Language and Cultural Differences on the Flight Deck](https://skybrary.aero/index.php/Language_and_Cultural_Differences_on_the_Flight_Deck)).

5. CONCLUSION

Simple communication is always desirable and advisable between two individuals, as long as it does not show any limitations, particularly in professions. Individuals who are poor listeners are poor communicators, as communication is not simply about what the other individual says. Language barriers are likely to play a key role in any multilingual group relationship and they are present in every-day life situations as well as in various jobs. In this technological world of modern air traffic, it is almost unbelievable that the majority of aviation disasters are caused by human error due to language barriers which result into miscommunication. Communication failures have been blamed for numerous deaths in plane crashes, warns an expert who has reviewed the language that pilots and air traffic controllers use. Yet, these plane disasters can be minimized due to many methods. Experts argue that the most significant step would be made through more serious approach to lack of English language skills and knowledge. They suggest that implementation of English, as a global language, is vital, that all crew, including pilots and first officers, must be aimed at trainings so as to strengthen the communication and collaboration. By overcoming barriers to communication, the information should not just be heard, but also received in the proper way that the receiver understands it. Thus, language barriers would at least be minimized so as to avoid fatality. For all these reasons, we concluded that much more research must be done to halt language barriers that lead to fatality and experts should pay more attention to English language proficiency trainings aimed at aviation crew to strengthen communication among them.

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