

THE ANALYSIS OF TESTING PILOTS AND ATCS IN CRISIS COMMUNICATION

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***Abstract:** This article explores the attitude of pilots, ATCs and students studying this specialization to communication. The author conducted a survey of the mentioned group to learn about effects of human factor in critical communication situations requiring high attention. The task is to highlight the importance of communication for air traffic control and flight safety. Aviation companies and human factor specialists all over the world realize the need to reveal and solve the problem, and reduce communication errors and then air incidents and accidents. The survey results are, so far partial; the research will continue and depends a lot on air personnel readiness. It is a challenge for them to pay more attention to uncovering the impact of various circumstances on communication, cooperate in completing questionnaires and participate in research interviews.*

***Keywords:** communication, flying personnel, CRM, stress, errors, human factor, attention.*

1. INTRODUCTION

The human factor in aviation includes studies of human capabilities, limitations, behavioral and integration of knowledge into a system that is designed for them to improve the safety, performance and generally good system operator. All elements of the human factor influence communication in everyday life and especially at work. It is this factor which is very important for the aviation workplace.

2. GENERAL VIEW ON COMMUNICATION

The communication process is a part of everyday life. The use of both verbal and non-verbal communication is the very basis of how we converse, both on a personal and on a business level. Communication is the exchange and flow of information and ideas from one person to another; it involves a sender transmitting an idea, information, or feeling to a receiver. Effective communication

occurs only if the receiver understands the exact information or idea that the sender intended to transmit. Many of the problems that occur in an organization are the either the direct result of people failing to communicate and/or processes, which leads to confusion and can cause good plans to fail.

Studying the communication process is important because you coach, coordinate, counsel, evaluate, and supervise throughout this process. It is the chain of understanding that integrates the members of an organization from top to bottom, bottom to top, and side to side. Effective communication process is important because you coach, coordinate, counsel, evaluate, and supervise throughout this process. It is the chain of understanding that integrates the members of an organization from top to bottom, bottom to top, and side to side.

This paper introduces the research of the communication and has the aim to show the attitude of pilots and ATCs to communication process and a part of the partial investigation in this area.

2.1 Effective and safe communication.

Effective and safe communication is a specific task for aviation so aviation companies support the idea to find the barriers to effective communication between pilots, and between pilots and air traffic controllers (ATC) and other flying staff.

The combination of case examples, empirical research, and studies of literature present the opinion on effectiveness of communication.

2.2 Aviation human factor in conversation. When effective communication is at work, what the receiver decodes is what the sender sends. A breakdown in the communication process may occur if the intended message was not encoded or decoded properly. Comments may be taken the wrong way, a compliment may be taken as an insult, or a joke might be interpreted as a put-down.

Communication problems within aviation are further compounded by the reliance on and need for radio transmissions, which result in a degraded speech signal. Moreover, the cockpit is a noisy environment and the presence of noise makes it more difficult for foreigner listeners in English language as second language to understand speech (Gat, Keith, 1978).

Assumptions and errors of pilots are the largest at the time of an enormous burden on the crew, thus, when individual members must handle large amounts of information, incentives and perceptions but also to take important decisions on the next flight over. Also very stressful is solving of many non routine situations – engine shut down, decompression, reconciling of two aircraft, microburst before the takeoff / landing, cloud base near the decision height and below etc. Loss of so called situational awareness is the most common cause of accidents, which were marked as “human error”.

It is well known that the pilot and crew, as such, are affected by a very large number of stressors, impulses and other factors that affect concentration and attention throughout the flight.

Looking into the statistics of accidents that were directly caused by the loss of situational

awareness, however, encounter many accidents that their actions caused the crew with even a high degree of experience.

2.3 Human error in aviation. Human error in aviation is somewhat of a sensitive topic due to the recent tragic events of September 11, 2001. Many of the causal factors that contribute to accidents can be viewed as different “types” of human error. Human error can be defined as inappropriate human behavior that lowers levels of system effectiveness or safety, which may or may not result in an accident or injury (Wickens *et al.*, 1998). Technically, the term human error could include mistakes made by humans operating a system, humans who designed the equipment, humans who supervise the worker, and humans who trained or advised the worker. However, the term is usually used to describe operator error, the inappropriate behavior of the person directly working with the system. There are numerous ways to classify and categorize human error. We have a tendency to want to view error at the operator level. First, we tend to blame the individual; second we try to identify any other factors. Shealey (1979) suggests several reasons for why this narrow perspective is taken:

It is in the interests of the company to blame the worker rather than admit deficiencies in their procedures product or system. Operator error is a very common cause of accidents. However, studies of accidents revealed that in no case was human error the only factor. They proposed a model of contributing factors in accident causation – CFAC.

The factors are broad & encompass most factors found in other models. Their model includes and emphasizes management, social and psychological factors. Also, human factors variables are recognized in the categories: Physical environment, Equipment design, and Work itself.

2.4 Different studies on communication studies in aviation. When people engage in a conversation, they typically do so with the intent of making themselves understood. As such, they need to make sure that the other participants are attending to them, actively

listening, and understanding what they are saying. Since unresolved uncertainties can lead to communication errors, people cooperate with each other to establish and maintain the mutual belief that their utterances have been understood well enough for current purposes (Clark, 1996, 1987, 1989). An example of this kind of collaboration is the use of backchannels. When participants in a conversation sufficiently understand an utterance, they will typically give feedback through head nods or acknowledgements, such as “uh huh”. On the other hand, if they do not understand, they will attempt to clear up their uncertainties until they have coordinated not only the content of their utterance but also their beliefs about what they mutually understand (Clark, 1996).

In the past decades a lot of research has been performed on communication between controllers and pilots. It is clear that over the years the different studies found similar communication problems and causes of communication errors. One may conclude that despite the studies and recommendations that have been made in the past, controllers and pilots continue to make the same communication errors. This is not surprising because pilot-controller communication is still highly dependent on the human factor. Nevertheless, the ‘system’ is robust in a sense that millions of instructions are given per year, whereas the number of reported occurrences is relatively small.

Many instances of miscommunication and communication problems are apparently caught and solved by the controllers and pilots, leaving them only with momentary confusion or annoyance. On the other hand, communication plays a vital role in aviation and a breakdown in communication can have serious safety consequences. It is observed in the literature study that most communication problems have causal factor associated with human performance limitations. Factors often mentioned in the various studies are controller workload, frequency congestion, and non-standard phraseology, read back/hear back errors, similar call-signs, message complexity, speech rate, language proficiency and accent.

Matchette searches the ASRS database for records which made reference to nonstandard phraseology and 260 reports were reviewed (Matchette, 1995). Many reported incidents resulted in little more than momentary confusion or annoyance for pilots and controllers.

However, nearly half the reports involved near mid-air collisions, loss of standard ATC separation, runway transgressions or other conflicts with potentially serious safety consequences.

The report gives examples for common non-standard phraseology for each phase of flight and suggests alternate wording which may have prevented the incident.

SCTA is on call sign confusion prevention in France (SCTA, 2003). French air traffic control statistics show that the prevention of call sign similarities by SCTA is very efficient with French airlines working in co-operation. The first way of struggling against call sign similarities is to co-ordinate work at a European level and not at all relies on a random call sign affectation. Longer term, the solution could be a real time call sign allocation in the same way as the slot allocation.

2.5 Communication as a part of crew resource management (CRM). Crew CRM training workshop is from NASA in 1979, which focused on improving aviation safety. NASA research presented that the main cause of most aviation accidents was a human factor and that the main problem was the failure of interpersonal communication, leadership and decision making in the cockpit. Various models of CRM were successfully adapted to various organizations. CRM training encompasses a wide range of knowledge, skills and attitudes including communications, situational awareness, problem solving, decision making and teamwork together with all the sub-disciplines. CRM can be defined as a system that enables the best use of all available resources, equipment, procedures to promote safety and improve safety and traffic effectiveness.

CRM is focused not so much on the technical knowledge and skills needed to fly and operate aircraft, but the cognitive and

interpersonal skills necessary for flight control in an organized system of air. In this context, we can define the cognitive ability of mental processes as necessary to obtain and maintain and situational awareness of the issues and decisions.

Pay Attention is paid to interpersonal relations, communications and conduct of a wide range of activities associated with teamwork. It is not limited to multi pilot aircraft crew, but also applies to single pilot aircraft, where it is necessary to link with other aircraft, ground control to successful flight.

3. RESEARCH ON COMMUNICATION

The dissertation work, which is part of the research of human factor in communication of pilots, air traffic controllers and students studying this specialization, gives partial results.

Research results and number of respondents depends on the willingness of those groups to cooperate. Questionnaires themselves force individuals to think about problems that arise in communication and consider own expression.

3.1 Method used for the research. For this research the method of questionnaires was used to find out the attitude of aviation staff to communication. Especially pilots, air traffic controllers (ATCs) and students studying this specialization have been asked to fill in the questionnaire with 50 multiple questions which have been focused on:

1. Normal communication – (speaking, listening, gestures, focus, stress).
2. Communication in the workplace – aviation communication with a focus on listening.
3. Communication in the workplace – aviation communication with a focus on speaking.
4. Effects of other factors / language used – native or English.
5. Recognition of danger due to miscommunication.
6. Experience in communication.
7. Training, training, knowledge in communication.

They could perform the questionnaire through internet page www.iankety.sk from their home or work.

Questions have been short and clear like:

- If you believe the information you received is incorrect:

- a) you immediately correct the information;
- b) first you make sure if it is really incorrect;
- c) you correct the information only if you think that is very important;
- d) you do not correct the information.

- When listening the information:

- a) you always get nervous;
- b) you sometimes get nervous;
- c) you are never nervous;
- d) you cannot say.

- How patient are you when listening to another person?

- a) long time;
- b) long enough;
- c) short time;
- d) you have no patience to listen to.

3.2 Partial results of the research. As the research has been in process only some 20 respondents participated in it. As the results show the responses are very similar and it is conceivable given the assumption of further results.

Results are divided into two categories at the impact of human error in communication and the use of foreign (English) language.

78% of managers took part in pilot or ATC professions while the research. When communicating, people sometimes fear to pass information or to receive it. These concerns depend on the circumstances in which it takes place and only 67% is attributed to this fact. The fears are contributing to the person communicating with the listener is nadridený-77% of respondents felt concerns in an interview with “nadrideným”. At each site supervisor and subordinate relationship exists in this respect and mutual trust. Most bosses trust their subordinates’ information - 9% complete and 63% more than not. Group 27% superiors do not always trust information from a subordinate.

An important aspect in communication is to work with erroneous information. Respondents - 54% are dependent in their

work on information from another person or another source - 22%. Not everyone is aware of the seriousness of a failure message, but only 91% correct his mistake now, and only 4.5% to await the response and report that the cast was really wrong. Habits of everyday communication are also

reflected in particularly like the attention, nervousness, awareness of the interference environment, memory, facial expressions and gestures and others.

The following table shows the results of communication in the following points:

Table 1. Different impacts on communication

Respondent is a listener:	Excellent 22%	Good 77%	
Prefers	Written message 54%	Information face to face 45%	
When listening to known information	Focused on details 50%	Not always focused 50%	
Nervous when listening	Sometimes 31%	Never 36%	I do not know 31%
Recognizes a nervous speaker	Always 31%	Sometimes 68%	
Remembers information	Long time 31%	Long enough 50%	Short time 18%
Focused on information	Perfectly 40%	Only key words 59%	

Effective communication is not a simple process and preliminary results show that in Aviation, employees realize the seriousness of the transmission of messages, but distractibility and nervousness considerably exist. The next area is quality of hearing which depends on radio transmission, quality of equipment and ambient noise. Half of respondents are sure these mentioned facts lower the quality and reliability of received information.

Important to the pilot is the clarity and speed of information about weather and hazards coming from the air traffic controller, and the rest of his/her team members including copilot, flight engineers, and cabin attendants (Busse, 1999).

Also English language should be mostly used for communication but if they use English only if they have to.

The aviation staff communicates among themselves in native language and they use English rarely, they sometimes have a problem to use English if they do not speak English for a long time - 54%. Some of them - 27% do not have any problems. People come to work from

their family background that significantly effects communication at work, concentration positively or negatively (Fig. 1, Fig. 2).

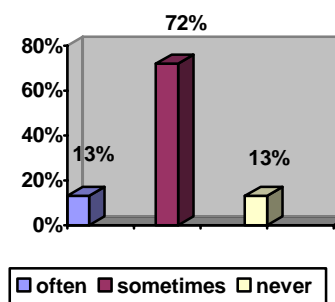


Fig. 1 Family problems affect communication at work

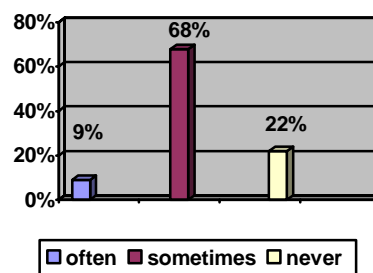


Fig. 2 People come to work from home tired

Finally, the course or special training in effective communication was attended by 18% of respondents, 13% have read something about it and 68% have never been trained. Also the not sufficient English is the result of the lack of English knowledge, not enough courses, and native language interference.

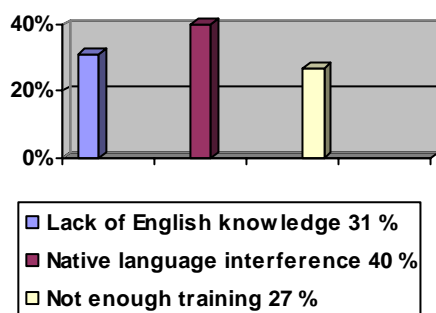


Fig. 3 Not sufficient usage of English language

Language use should be considered as a variable of interest in crew factors. Language is a coping mechanism in that it helps individuals lessen and manage both the causes and the effects of stress. There are links between pilot language use and flight outcome measures.

Language use is dynamic, as it is sensitive to both workload and position, and varies systematically with flight outcome measures. This is in contrast to a more static measure such as “paper and pencil” measurements of personality, which are stable across time and situation.

4. CONCLUSIONS

The results of the research suggest that communication problems pose a threat to aviation safety. Communication is greatly underestimated and is considered a normal human ability. It is necessary to create awareness of pilots and ATC, that communication is a serious process, and spoken words are not easy to erase. This research is designed to emphasize this fact, and after obtaining further results will suggest solving the problems that will result from the research. It is necessary for the pilots and ATC to be aware of the seriousness of the communication process, the importance of

each word, the way it is transmitted. Effectiveness of communication depends on many factors, but for the entire human factor must be sought. Nervousness, impatience, inconsistency, poor knowledge of English reduces the effectiveness of communication and seriously endangers the safety of air traffic (Čekan, 2010).

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