



LHUFTA

INVESTIGATING LANGUAGE

AS A

HUMAN FACTOR IN AVIATION

(LHUFTA)

A GUIDANCE MANUAL

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INVESTIGATING LANGUAGE AS A HUMAN FACTOR IN AVIATION

PART ONE: INTRODUCTION

PURPOSE

The purpose of the LHUFTA Manual for the Investigation of Language as a Human Factor in Aviation is to provide direction and support to accident and incident investigators in the consideration of the full range of potential communication factors that may contribute to the chain of events that lead to a serious incident or accident.

ROLE OF LANGUAGE

Operational and safety experts universally acknowledge the role that communication has in maintaining safe operations. Yet, the complexity of communication--involving first language use, English as a second language use, standard ICAO phraseology, or other CAA phraseology, and sometimes slang or incorrect, or sloppy phraseology, and including cultural awareness issues, power distance, or group versus individual orientations--means that investigating Language as a Human Factor can be difficult.

Communications, language use, language proficiency, and cultural issues--the subject matter is simply so varied and complex that it is arguably an area of human factors that merits specialist investigation and treatment.

The International Society of Air Safety Investigators suggest that accident investigation “findings” be defined as “all significant conditions and events, causal and non-causal, found in the investigation.” Relatedly, “Cause” has been defined as a “deficiency the correction, elimination or avoidance of which would likely have prevented or mitigated the mishap, damage, or significant injuries. A cause is an act, an omission, a condition or a circumstance [that] either starts or sustains the mishap sequence,” (Wood and Swegginnis, 2006, p. 8).

Without adequate awareness of and understanding of language as a human factor, accident investigators, and the industry, in general, too often miss, in particular, the more subtle aspects of language use in aviation safety as a “significant condition” upon which other errors may be allowed to develop.

For example, in many anonymous incident reporting systems, the variety of language factors are lumped together under “communication,” or “language barrier.” Yet, as this Manual, and other information provided on the LHUFTA website, shows, communication factors in aviation are many, varied, and meaningful. If we are not able to accurately identify such potential factors, then the industry misses opportunities for improving safety.

A TAXONOMY OF LANGUAGE AND COMMUNICATION IN AVIATION

As a first step, a taxonomy of language factors in aviation communications will assist the industry in better identifying language factors in accidents and incidents.

Without a standardized taxonomy of language factors, it is difficult for researchers to investigate how frequently language issues occur as a factor contributing to incidents. This prevents the industry from having a clear picture of the impact of language on aviation.

PROTOCOLS

Another tool for accident investigators is a standard protocol for investigating language in aviation accidents and incidents. Whether language is determined to be a contributory or causal

factor or not in an accident, it should be investigated as closely and as expertly as are other human factors. As a first step, language information should be systematically gathered and made part of the factual report in the same way as pilot flight hours and experience currently is.

The protocols provided below assist accident and incident investigators in gathering basic information that is fundamental to considering and eliminating, or investigating further, any potential communication issues, including language use, language proficiency, or cultural factors.

CONCLUSION

This Guidance Manual is intended to serve as support to accident investigators in the investigation of possible language factors in accidents and incidents. While not exhaustive, and requiring revision and review, it is offered as a starting place upon which a better understanding of language and communication factors can be understood.

PART TWO: BRIEF SUMMARY OF ICAO LANGUAGE REQUIREMENTS

A) Introduction

A clear understanding of the ICAO Standards and Recommended Practices related to language proficiency is necessary. The ICAO language SARPS are generally referred to as the ICAO Language Proficiency Requirements, ILPRS or LPRS. The LPRS require that pilots and air traffic controllers demonstrate proficiency in English in order to fly or operate along international routes.

The language proficiency requirements include

- An ICAO Rating Scale for language proficiency (Appendix A in this Manual),
- Standards and Recommended Practices that are contained in several ICAO annexes (Annex 1, 6, 10, 11, and the PANS-ATM), and
- ICAO Document 9835, the Guidance Manual for the Implementation of Language Proficiency Requirements.

From the point of view of the accident investigator, the more salient aspects of the ICAO LPRS are as the following.

1. **ICAO Annex 6 para 3.1.8** requires that, “**Operators** shall ensure that flight crew members demonstrate the ability to speak and understand the language used for radiotelephony communications as specified [Operational Level 4] in Annex 1.”
 - That is, it is the responsibility of *airlines* to ensure their pilots have adequate English language proficiency.
2. Pilots must demonstrate ICAO Operational Level 4 (out of six levels on the ICAO Rating Scale) to operate internationally.
3. Language proficiency must be documented on pilot licenses.
4. It is the responsibility of the CAA’s to provide oversight of national English language testing (**ICAO Annex 1, Appendix 1, para 1.**)
 - CAA’s may provide national testing, in-house or contract to a testing service, or they may approve an airline’s in-house testing or sub-contract.
 - Or a CAA may accept the language endorsement from another license (such as an FAA license)
5. ICAO does **not** provide any aviation English testing.
6. ICAO does provide a voluntary Aviation English Test Service that reviews tests and “endorses” tests as compliant or not compliant with ICAO Test Criteria (Cir. 318).
 - To date, only three of the dozens of available aviation English tests have been endorsed as compliant. (<https://www4.icao.int/aelts/>)
 - Overall, language testing in aviation remains largely unregulated, and there is very wide variety in quality and reliability of the aviation English tests on the market, with even serious allegations of “cheating” in some instances. Accident investigators should seek to confirm language proficiency through various means (language tests reports, company reports, training records, etc.) but should not assume that a score on a language test is automatically or necessarily valid.

7. The ICAO LPRS determine an adequate level of English language proficiency for pilot-ATC communications.
 - 7.1. The level of English language proficiency required for cross cultural flight deck communications, for effective crew resource management, or for flight training in English contexts may be higher. ATC communications are generally relatively constrained, while CRM, flight deck communications, and flight training in English require intensive communications in English that extend beyond the requirements of performing at ICAO Operational Level 4. Accident investigators should simply be aware of the varying demands on language ability at various stages of a flight.
8. ICAO LPRS require proficiency in *not only* the use of ICAO phraseology, but emphatically also in plain language proficiency.

B) ICAO Operational Level 4

ICAO Operational Level 4 language competencies (*From ICAO Document 9835*):

At ICAO Operational Level 4, the pilots should be able to:

- Communicate effectively in voice-only and in face to face situations;
- Communicate on work related topics with accuracy and clarity;
- Handle with relative ease the linguistic challenge presented by unexpected turn of events within context of work;
- Use an accent that is broadly intelligible in an international context.

ICAO Operational Level 4 language proficiency descriptors (excerpts from ICAO Rating Scale)

- Pronunciation ... only sometimes interferes with ease of understanding.
- Grammar errors may occur...but rarely interfere with meaning.
- Vocabulary is sufficient to communicate work related topics. Can paraphrase.
- Can communicate effectively.
- Comprehension mostly accurate on work related topics.
- Interacts adequately, can initiate and maintain exchanges, can confirm and clarify.

PART THREE: BASIC GUIDANCE ON LANGUAGE AS A HUMAN FACTOR IN AVIATION

Language and culture affect aviation safety in many ways. While the ICAO language proficiency requirements address pilot and controller radiotelephony communications specifically, that is only one communication event requiring careful and proficiency language use. Other communication and language use events include

- Flight deck communications between pilots or flight engineers; Can be first language communications, or often English as a foreign language communications.
- Reading or listening to checklists or emergency checklist instructions being read aloud in English as a second language.
- Pilot and maintenance communications, written or spoken.
- Situational awareness issues in operational environments in which English and a national language are used.
- Safety communications between pilots and flight attendants. Safety instructions between flight attendants and passengers.
- Communications between pilots and emergency rescue services.

A) Some examples of language as a human factor in accidents

Language proficiency can impact flight safety in a number of ways. Sometimes language use or inadequate language proficiency is a clear contributory factor in an accident or incident:

- Issuing unclear instructions (“Left turn” instead of “Left Turns,” Tenerife 1980)
- Being unable to understand non-routine ATC instructions (LOT 282 over UK)
- Not understanding audio warnings on flight deck (China 1993)
- Incorrect phraseology (Tenerife 1977)
- Inadequate plain language proficiency (Avianca in NY 1990; and American in Cali, 1995 with inadequate controller English)
- Misunderstood flight level (midair over India, 1996)

Sometimes language has a more subtle but still significant affect on aviation safety, playing a role in the complex chain of events that is harder to detect but may have contributed to constructing the landscape on which other errors could build:

- Pilots (or controllers) who speak English as a foreign language can experience *language apprehension* and subconsciously seek to avoid actions that would require additional or non-standard communications with ATC in English.
- Reading and listening to English checklists being read in English as a foreign language.
- Sometimes cross cultural CRM flight deck communications are in English and English as a foreign language.
- Being unable to request, direct, or assist emergency services.

B) General Information

If a need for external linguistic input is identified, the linguistic expert should have “Best Qualifications” according to ICAO Guidance Document 9835: a Master or Ph.D. in *Applied Linguistics*¹ and Experience in aviation communications.

¹ As distinct from other communication academic fields, such as Speech Therapy, Communications, or literature based degrees, such as English, or pure theoretical linguistics.

INITIAL QUESTIONS CONCERNING PILOT LANGUAGE PROFICIENCY AND LANGUAGE USE ON THE FLIGHT DECK AND WITH ATC

1. What is the documented English language proficiency level of each pilot involved in the accident? This information is required to be documented on their license(s)². (See protocol next pages.)
 - 1.1. Because some pilots have multiple licenses, it may occur that pilots have multiple language endorsements, and all should be noted, especially if the endorsements differ.
 - 1.2. What tests or assessments were used to determine English language proficiency levels? Is that test endorsed in the new ICAO Aviation English Test Service?
2. What language(s) was used for flight deck communications and CRM? For reading checklists? For comprehending audio alerts? Were pilots reading or listening to checklists in a second language?
3. Is there evidence that any pilots experienced problems with ATC communications?
4. Do any controllers report any problems with pilot-ATC communications?
5. If interviewing pilots, do pilots feel their English language proficiency was adequate for all the communicative requirements of the flight and subsequent incident or accident?
 - 5.1. During pilot interviews, do investigators observe any issues with English language proficiency? Are pilots able to manage concrete, in-context, work related questions about the incident or accident? (ICAO Level 4 Proficiency).
 - 5.2. Do any pilots report any intra-cockpit communication problems? Did any pilot experience difficulty understanding any checklist or audio alert in English?
6. If the communications with ATC had been in the pilots' native language, would that have made a difference in their decision-making processes?
7. When relevant, did the fact that this aircraft was operating in an English-as-a-foreign-language environment affect flight crew performance? Did they communicate with ATC less than if these events had unfolded in a native language context? More?

² Because aviation English testing is relatively new and by and large unregulated, investigating language carefully may uncover inconsistencies between the English language proficiency of pilots as stated on licenses, that may contrast with their actual ability to communicate effectively with ATC or with the accident investigation team.

A protocol form to investigate possible language issues in aviation accidents and incidents

A. Basic Language Information should be documented

| PIC <i>Only list those languages the PIC speaks at ICAO Expert Level 6.</i> | |
|---|--|
| Part 1: Primary Language(s) Check one: | |
| <input type="checkbox"/> Mono-lingual <input type="checkbox"/> Bilingual or <input type="checkbox"/> Multilingual | |
| Language 1 | |
| Language 2 | |
| Other primary languages? | |
| | |
| | |

| PIC Other Language(s) | | | |
|------------------------------|--|---------------------|---------------|
| Language | ICAO Proficiency Level (circle one) | Language Assessment | |
| | | Date of Test | Test Provider |
| | 1 2 3 4 5 6 | | |
| | 1 2 3 4 5 6 | | |
| | 1 2 3 4 5 6 | | |

FO
Only list those languages the PIC speaks at ICAO Expert Level 6.

Part 1: Primary Language(s) Check one:

Mono-lingual
 Bilingual or
 Multilingual

| | |
|--------------------------|--|
| Language 1 | |
| Language 2 | |
| Other primary languages? | |
| | |
| | |

| FO Other Language(s) | | | |
|----------------------|--|---------------------|---------------|
| Language | ICAO Proficiency Level (circle one) | Language Assessment | |
| | | Date of Test | Test Provider |
| | 1 2 3 4 5 6 | | |
| | 1 2 3 4 5 6 | | |
| | 1 2 3 4 5 6 | | |

