



RADIOTELEPHONY

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NCAA PRESENTATION BY RODNEY THERON

1. WHY DO WE NEED STANDARD PHRASEOLOGY

Standard phraseology reduces the risk that a message will be misunderstood and aids the read-back/hear-back process so that any error is quickly detected.

Ambiguous or non-standard phraseology is a frequent causal or contributory factor in aircraft accidents and incidents

Annex 10 – Radio Telephony Procedures

Radio Telephony Manual

References:

- *Annex 10, Volume II, Chapter 5*
- *PANS-RAC, Doc 4444-RAC/501/12*
- *ICAO Manual of Radiotelephony Doc 9432-AN/925*

MISCOMMUNICATION

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Miscommunications may broadly be applied to a range of verbal communication problems ranging from misunderstandings, such as those due to ambiguity, cultural differences, language structure, to those resulting from poor phraseology.

Miscommunication can also occur due to technical problems, such as microphone “clipping” and transmitting over another’s radio signal.

Miscommunication is a pervasive problem in air traffic control and, although infrequent when considered as a percentage of daily transmissions, nevertheless, has been a causal factor in numerous fatal accidents.

Tenerife 1977

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FATAL EXAMPLES IF THERE IS A LACK OF STANDARD PHRASEOLOGY/MISUNDERSTANDING

Deadliest accident in aviation industry

The collision between the Pan Am and KLM Boeing 747's at Tenerife in March 1977, which killed 583 people, was a defining event in aviation safety

While there were many predisposing human factors involved, the accident was a tragic lesson in miscommunications.

Tenerife 1977

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The accident demonstrated that, in the aviation industry, “information transmitted by radio communication can be understood in a different way to that intended, as a result of ambiguous terminology and/or the obliteration of key words or phrases” and that “the oral transmission of essential information, via single and vulnerable radio contacts, carries with it great potential dangers”

Nine months after this accident, the Air Navigation Committee of the International Civil Aviation Organisation (ICAO) took action, issuing three reports and implementing radiotelephony changes in 1984.

THREAT AND ERROR MANAGEMENT

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- **Expectation error:** Is likely to occur when two pilots both expecting a certain clearance, climb/descend etc., or when pilots expecting a take off clearance, as in the Tenerife accident and while only issued with a clearance to comply with after take off the crew misunderstood it as an actual take-off clearance.
- The KLM crew then received instructions that specified the route that the aircraft was to follow after takeoff. The instructions used the word "takeoff," but did not include an explicit statement that they were cleared for takeoff.

THREAT AND ERROR MANAGEMENT

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- Meurs read the flight clearance back to the controller, completing the readback with the statement: "We are now at takeoff." Captain Veldhuyzen van Zanten interrupted the co-pilot's read-back with the comment, "We're going."
- The controller, who could not see the runway due to the fog, initially responded with "OK" (terminology that is nonstandard), which reinforced the KLM captain's misinterpretation that they had takeoff clearance. The controller's response of "OK" to the co-pilot's nonstandard statement that they were "now at takeoff" was likely due to his misinterpretation that they were in takeoff position and ready to begin the roll when takeoff clearance was received, but not in the process of taking off.

THREAT AND ERROR MANAGEMENT

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- The controller then immediately added "stand by for takeoff, I will call you", indicating that he had not intended the instruction to be interpreted as a takeoff clearance.
- As a result of this accident and thereafter, the word “take-off” is only permitted to be used in the clearance to take-off.

- **Technical error**
- A **simultaneous radio call** from the Pan Am crew caused mutual interference on the radio frequency, which was audible in the KLM cockpit as a three-second-long shrill sound (or heterodyne). **This caused the KLM crew to miss the crucial latter portion of the tower's response.** The Pan Am crew's transmission was "We're still taxiing down the runway, the Clipper 1736!" This message was also blocked by the interference and inaudible to the KLM crew. Either message, if heard in the KLM cockpit, would have alerted the crew to the situation and given them time to abort the takeoff attempt.

- Team Resource Management in Communications
- After the KLM plane had started its takeoff roll, the tower instructed the Pan Am crew to "report when runway clear." The Pan Am crew replied: "OK, will report when we're clear." On hearing this, the KLM flight engineer expressed his concern about the Pan Am not being clear of the runway by asking the pilots in his own cockpit, "Is he not clear that Pan American?" Veldhuyzen van Zanten emphatically replied "Oh, yes" and continued with the takeoff.

- speak in a moderate clear tone,
- listen out before transmitting,
- listen out not only to your own callsign but to positions of any aircraft in the vicinity,
- always use standard phraseology, ref: ICAO Manual of Radio Telephony,

- E.g A vector issued during sequencing to “Tango Alpha Delta” (TAD) was acknowledged by “Tango Alpha Alpha” (TAA) and the wrong aircraft commenced a turn before I could cancel it, fortunately without consequences, because both pilots expected to be issued with vectors.
- Homophony confusion with “alpha” and “delta” occurs occasionally with most controllers, as does a pilot reading back “Flight level two seven zero” when the controller has issued “Climb to flight level two zero zero”.

TYPES OF INFORMATION

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- Two kinds of information are contained in speech:
- **quantitative information and qualitative information**. Essentially they distinguish what is said from how it is said.
- **Quantitative information** includes an aircraft's speed, level, heading, position, and so on, and can be communicated in writing or digitally and displayed.
- **Qualitative information** includes voice quality, formality, degree of stereotyping, pronunciation, accent, pace, pauses, level of detail, redundancy, courtesy, adherence to standard phraseologies, acknowledgement and so on (Hopkin, 1995; National Research Council, 1997).

EXPECTATIONS – SOME HUMOUR

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- Speedbird Nine: Mayday, Mayday, Mayday—Speedbird Nine. We have lost all four engines. Out of [Flight Level] 370.
- Jakarta Control: Speedbird Nine, have you got a problem?
- Speedbird Nine: Jakarta Control—Speedbird Nine. We have lost all four engines. Now out of 360.
- Jakarta Control: Speedbird Nine—you have lost number four engine?
- Speedbird Nine: Jakarta Control—Speedbird Nine has lost all four engines, repeat all four engines! Now descending through Flight Level 350

Fortunately the pilot eventually got his message through, and we all know this was on of the most successful emergencies in aviation history, in stark contrast to Tenerife.

- A controller using non-standard phraseologies and words must, therefore, be vulnerable to legal liability should an accident result from consequent miscommunication
- When information is available to a controller, he or she might be liable if that information, when passed to a pilot, was either inaccurate, insufficient or untimely, that brings us to the need for **ELP (English Language Proficiency)**

- WHY IS IT IMPORTANT?
- It is to **objectively assess** and **rate** the language proficiency of pilots and air traffic controllers using **standard criteria** so that the **ICAO Language Proficiency Requirement is consistently and uniformly met without compromising safety of flight** and **affecting** the professional life of pilots and air traffic controllers negatively.
- Areas of focus of the test - plain language, (not radiotelephony phraseology) and language use (not content/ technical knowledge)

- TO DETECT STRENGTHS AND WEAKNESSES IN THE FOLLOWING AREAS
- Pronunciation
- Structure
- Vocabulary
- Fluency
- Comprehension

EXAMPLE OF NON-STANDARD R/T

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- Pilot: Tower ETH 500, is there rain over the station?
- ATC: Affirm, light rain over the station.
- Pilot: Thank you.

• THANK YOU

• ANY QUESTIONS