

May 9th, 10:35 AM - 11:05 AM

## A Linguistic Review of Aviation Accidents

Elizabeth Mathews

Embry-Riddle Aeronautical University / ICAEA, MATHEWE1@erau.edu

Follow this and additional works at: <https://commons.erau.edu/icaea-workshop>

---

### Scholarly Commons Citation

Mathews, Elizabeth, "A Linguistic Review of Aviation Accidents" (2018). *International Civil Aviation English Association*. 5.

<https://commons.erau.edu/icaea-workshop/2018/wednesday/5>

This Presentation is brought to you for free and open access by the Conferences at Scholarly Commons. It has been accepted for inclusion in International Civil Aviation English Association by an authorized administrator of Scholarly Commons. For more information, please contact [commons@erau.edu](mailto:commons@erau.edu).



**A Linguistic Review  
of the  
ASN Aviation Safety Database  
1990 - 2012**

Investigating  
Language

# Language

"One of those nagging issues. ...  
You can just sort of sense it sometimes beneath the  
surface."

Barry Sweedler

Former NTSB, Director of Office of Safety Recommendations and  
Accomplishments

quoted in *New York Times*, Dec. 9, 1996.

"Language Gap Plays Role in Hundreds of Air Deaths" by Matthew Wald

Investigating  
Language



**HELLENIC REPUBLIC  
MINISTRY OF TRANSPORT & COMMUNICATIONS**

**AIR ACCIDENT INVESTIGATION  
& AVIATION SAFETY BOARD  
(AAIASB)**



**AIRCRAFT ACCIDENT REPORT**

**HELIOS AIRWAYS FLIGHT HCY522  
BOEING 737-31S  
AT GRAMMATIKO, HELLAS  
ON 14 AUGUST 2005**

**11 / 2006**

## Findings

Before hypoxia began to affect the flight crew's performance, inadequate CRM contributed to the failure to diagnose the pressurization problem

## Latent Cause

Inadequate application of crew resource management principles

Investigating  
Language

# References to Language

- "...lack of clarity in message [from Commander]
- HCY522 communicated with Larnaca Tower in English with some phrases in Greek and with Nicosia ACC also in English
- The official language of communication at the company was English. English was very widely used in Cyprus since the country was part of the British Commonwealth.
- Ops manager did not perceive any communication difficulties among crew members at the company.
- The Flight Safety Manual was written in the English language as prescribed by JAR – OPS 1.040

# Captain's English communications

The Captain reported that “the ventilation cooling fan lights were off.”

Due to the **lack of clarity in the message**, the Ground Engineer asked him to repeat.

Then, the Captain replied “where are the cooling fan circuit breakers?”

The Board also entertained the possibility that the Captain really meant to say “Cabin Altitude Warning horn” when he contacted the Dispatcher at the Helios Operations Centre and that he was, in reality, aware of the difference – but referred to the warning by its most frequently encountered name (i.e. takeoff configuration horn).

**As English was not the Captain's native language  
and under the influence of stress,  
this possibility could not totally be ruled out.**

# Captain's English communications

- After that, he [Dispatcher] was unable to understand the Captain's concerns and suggested the Captain talk to the on-duty Ground Engineer.
- The Operations Dispatcher then suggested that the Cypriot First Officer be asked to talk in Greek with the Cypriot Engineer also on duty.



# Considering language

- ... the Board generally differed on whether there were any difficulties in communication between the Captain and the Helios Operations Centre.
- In particular, according to some statements there were difficulties due to the fact that the **Captain spoke with a German accent and could not be understood by the British engineer.**
- The British engineer did not confirm this, but did claim that he was also unable to understand the nature of the problem that the Captain was encountering.

# Considering language

- The language difficulties prolonged resolution of the problem, while the aircraft continued to climb.
- Moreover, the communication difficulties could also have been compounded by the onset of the initial effects of hypoxia.

“One of those nagging issues. ...”

# Language related Findings or Recommendations

**None**

Investigating  
Language

# FINDINGS

- All significant conditions and events, causal and non-causal, found in the investigation

**International Society of Air Safety Investigators**

# CAUSE

- 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.

***Aircraft Accident Investigation***  
**Wood and Sweggins, 2006, p. 8**

Investigating  
Language

# Accidents / Serious Incidents

## ICAO Cites ADREP

2001 - Milan (114)  
2000 - Paris (1)  
1996 - India (349)  
1995 - Colombia (159)  
1990 - NY (73)  
1997 - Tenerife (583)  
1976 - Zagreb (176)

## Language Cited in Accident or Incident Investigation Report

2006 - Brazil (154)  
2007 - London (0)  
2005 - Greece

**Bilingual, multilingual event.  
Language valid investigative question  
and remains inadequately  
addressed.**

2015 - Florida Cessna (1)  
2007 - Israel (0)  
2002 - Germany (71)  
2000 - Taiwan (82)  
1999 - Chicago (0)  
1980 - Saudi Arabia  
(391)  
1974 - Paris (346)

Investigating  
Language

# A Linguistic Survey of the ASN Aviation Safety Database

Method

Data

Results

Findings

Summary and Conclusions

Investigating  
Language

# Research Team

## Applied Linguistics

**Joan Carson, Ph.D.** Applied Linguistics

**Elizabeth Mathews, M.A.** Tesl/AL

## Graduate Students

**Georgia State University**

Tyler Heath (ERLI)

## Aviation Operational

**Steven Singleton**—Maintenance; Safety

**Capt. Rick Valdes** — United Airlines (Ret.)  
ALPA Accident Investigator  
ICAO PRICESG member

**Professor Dave Williams** — Pilot; Safety

Investigating  
Language

# Aviation**Safety**Network

an exclusive service of **Flight Safety Foundation**

[1910](#) | [1911](#) | [1912](#) | [1913](#) | [1914](#) | [1915](#) | [1916](#) | [1917](#) | [1918](#) | [1919](#)  
[1920](#) | [1921](#) | [1922](#) | [1923](#) | [1924](#) | [1925](#) | [1926](#) | [1927](#) | [1928](#) | [1929](#)  
[1930](#) | [1931](#) | [1932](#) | [1933](#) | [1934](#) | [1935](#) | [1936](#) | [1937](#) | [1938](#) | [1939](#)  
[1940](#) | [1941](#) | [1942](#) | [1943](#) | [1944](#) | [1945](#) | [1946](#) | [1947](#) | [1948](#) | [1949](#)  
[1950](#) | [1951](#) | [1952](#) | [1953](#) | [1954](#) | [1955](#) | [1956](#) | [1957](#) | [1958](#) | [1959](#)  
[1960](#) | [1961](#) | [1962](#) | [1963](#) | [1964](#) | [1965](#) | [1966](#) | [1967](#) | [1968](#) | [1969](#)  
[1970](#) | [1971](#) | [1972](#) | [1973](#) | [1974](#) | [1975](#) | [1976](#) | [1977](#) | [1978](#) | [1979](#)  
[1980](#) | [1981](#) | [1982](#) | [1983](#) | [1984](#) | [1985](#) | [1986](#) | [1987](#) | [1988](#) | [1989](#)  
[1990](#) | [1991](#) | [1992](#) | [1993](#) | [1994](#) | [1995](#) | [1996](#) | [1997](#) | [1998](#) | [1999](#)  
[2000](#) | [2001](#) | [2002](#) | [2003](#) | [2004](#) | [2005](#) | [2006](#) | [2007](#) | [2008](#) | [2009](#)  
[2010](#) | [2011](#) | [2012](#) | [2013](#) | [2014](#) | [2015](#) | [2016](#) | [2017](#) | [2018](#)

Investigating  
Language



# Aviation**Safety**Network

an exclusive service of **Flight Safety Foundation**

[1910](#) | [1911](#) | [1912](#) | [1913](#) | [1914](#) | [1915](#) | [1916](#) | [1917](#) | [1918](#) | [1919](#)  
[1920](#) | [1921](#) | [1922](#) | [1923](#) | [1924](#) | [1925](#) | [1926](#) | [1927](#) | [1928](#) | [1929](#)  
[1930](#) | [1931](#) | [1932](#) | [1933](#) | [1934](#) | [1935](#) | [1936](#) | [1937](#) | [1938](#) | [1939](#)  
[1940](#) | [1941](#) | [1942](#) | [1943](#) | [1944](#) | [1945](#) | [1946](#) | [1947](#) | [1948](#) | [1949](#)  
[1950](#) | [1951](#) | [1952](#) | [1953](#) | [1954](#) | [1955](#) | [1956](#) | [1957](#) | [1958](#) | [1959](#)  
[1960](#) | [1961](#) | [1962](#) | [1963](#) | [1964](#) | [1965](#) | [1966](#) | [1967](#) | [1968](#) | [1969](#)  
[1970](#) | [1971](#) | [1972](#) | [1973](#) | [1974](#) | [1975](#) | [1976](#) | [1977](#) | [1978](#) | [1979](#)  
[1980](#) | [1981](#) | [1982](#) | [1983](#) | [1984](#) | [1985](#) | [1986](#) | [1987](#) | [1988](#) | [1989](#)  
[1990](#) | [1991](#) | [1992](#) | [1993](#) | [1994](#) | [1995](#) | [1996](#) | [1997](#) | [1998](#) | [1999](#)  
[2000](#) | [2001](#) | [2002](#) | [2003](#) | [2004](#) | [2005](#) | [2006](#) | [2007](#) | [2008](#) | [2009](#)  
[2010](#) | [2011](#) | [2012](#) | [2013](#) | [2014](#) | [2015](#) | [2016](#) | [2017](#) | [2018](#)

Investigating  
Language

## 2012

Last updated: 25 April 2018

languages:     

164 occurrences in the ASN safety database, showing occurrence 1 - 100

1 2

date	type	registration	operator	fat.	location	pic	cat
<a href="#">09-JAN-2012</a>	Xian MA60	FAB-96	TAM	0	Guayaramerin...		A2
<a href="#">12-JAN-2012</a>	Let L-410UVP-E9	5Y-BSA	Blue Sky Aviation	0	Kichwa Tembo...		A2
<a href="#">18-JAN-2012</a>	DHC-8-315Q MPA	JA720A	Japan Coast Guard	0	near Kitakojima I...	 	A2
<a href="#">24-JAN-2012</a>	DC-9-83 (MD-83)	EC-JJS	Swiftair, op.for Gryphon Airlines	0	Kandahar Air...	 	A1
<a href="#">24-JAN-2012</a>	Canadair CRJ-200ER	N8524A	Pinnacle Airlines	0	Providence-T...	 	O1
<a href="#">30-JAN-2012</a>	Antonov An-28	9Q-CUN	TRACEP-Congo Aviation	3	near Namoya		A1
<a href="#">05-FEB-2012</a>	Airbus A320-211	JA8384	All Nippon	0	Sendai Airpo...	 	A1
<a href="#">09-FEB-2012</a>	DHC-6 Twin Otter 200	8Q-MAT	Maldivian Air Taxi	0	Male Interna...	 	A2
<a href="#">12-FEB-2012</a>	Gulfstream G-IV	N2SA	Trident Aviation Services, op.for Katanga Express	4+ 2	Bukavu-Kavum...	 	A1

# 164 Occurrences 2012

<a href="#">12-FEB-2012</a>	Gulfstream G-IV
<a href="#">12-FEB-2012</a>	Airbus A320-232
<a href="#">13-FEB-2012</a>	Learjet 55
<a href="#">13-FEB-2012</a>	Air
<a href="#">14-FEB-2012</a>	Air
<a href="#">17-FEB-2012</a>	Let
<a href="#">17-FEB-2012</a>	ATR
<a href="#">21-FEB-2012</a>	Loc
<a href="#">28-FEB-2012</a>	Ces
<a href="#">01-MAR-2012</a>	Ces
<a href="#">02-MAR-2012</a>	Ces
<a href="#">04-MAR-2012</a>	Ant
<a href="#">07-MAR-2012</a>	Boe
<a href="#">08-MAR-2012</a>	BAe
<a href="#">09-MAR-2012</a>	DHC
<a href="#">09-MAR-2012</a>	Bee
<a href="#">13-MAR-2012</a>	Boe
<a href="#">15-MAR-2012</a>	Cor
<a href="#">15-MAR-2012</a>	Loc
<a href="#">15-MAR-2012</a>	Ces

<a href="#">15-MAR-2012</a>	Cessna 501 Citation I
<a href="#">16-MAR-2012</a>	CASA CN-235M-10
<a href="#">17-MAR-2012</a>	Beech 1900C
<a href="#">22-MAR-2012</a>	Antonov An-2
<a href="#">22-MAR-2012</a>	Beech B300 Super
<a href="#">22-MAR-2012</a>	Douglas C-54G (D)
<a href="#">24-MAR-2012</a>	Cessna 208 Carava
<a href="#">29-MAR-2012</a>	Fokker 50
<a href="#">31-MAR-2012</a>	Boeing 777-246ER
<a href="#">02-APR-2012</a>	ATR 72-201
<a href="#">02-APR-2012</a>	Hawker Siddeley
<a href="#">09-APR-2012</a>	DHC-8-311Q
<a href="#">14-APR-2012</a>	Boeing 737-33A (C
<a href="#">15-APR-2012</a>	Canadair CRJ-200
<a href="#">15-APR-2012</a>	Fokker F-27 Frien
<a href="#">20-APR-2012</a>	Boeing 737-236A
<a href="#">21-APR-2012</a>	Curtiss C-46F
<a href="#">22-APR-2012</a>	Boeing 737-4H6
<a href="#">23-APR-2012</a>	Antonov An-2R

<a href="#">22-APR-2012</a>	Boeing 737-4H6
<a href="#">23-APR-2012</a>	Antonov An-2R
<a href="#">27-APR-2012</a>	Boeing 727-212
<a href="#">28-APR-2012</a>	Antonov An-24RV
<a href="#">30-APR-2012</a>	ATR-72-500
<a href="#">01-MAY-2012</a>	Airbus A300B4-60
<a href="#">02-MAY-2012</a>	Cessna 208B Gra
<a href="#">09-MAY-2012</a>	Sukhoi Superjet
<a href="#">11-MAY-2012</a>	Convair CV-580F
<a href="#">14-MAY-2012</a>	Dornier 228-212
<a href="#">15-MAY-2012</a>	DHC-6 Twin Otter
<a href="#">17-MAY-2012</a>	ATR-72-500
<a href="#">17-MAY-2012</a>	Shorts 360-100
<a href="#">18-MAY-2012</a>	Antonov An-2T
<a href="#">23-MAY-2012</a>	Antonov An-30B
<a href="#">24-MAY-2012</a>	Canadair CC-144
<a href="#">25-MAY-2012</a>	Cessna 208B Sup
<a href="#">28-MAY-2012</a>	Boeing 777-237LF
<a href="#">30-MAY-2012</a>	Embraer ERJ-140
<a href="#">30-MAY-2012</a>	Boeing 747-45EF
<a href="#">01-JUN-2012</a>	Boeing 737-4Y0

<a href="#">02-JUN-2012</a>	Boeing 727-221F
<a href="#">03-JUN-2012</a>	DC-9-83 (MD-83)
<a href="#">03-JUN-2012</a>	Lockheed P-2H Neptu
<a href="#">03-JUN-2012</a>	Lockheed SP-2H Nept
<a href="#">06-JUN-2012</a>	Swearingen SA227-AC
<a href="#">07-JUN-2012</a>	Learjet 60
<a href="#">09-JUN-2012</a>	ATR 42-500
<a href="#">10-JUN-2012</a>	Let L-410UVP
<a href="#">10-JUN-2012</a>	DHC-8-311
<a href="#">11-JUN-2012</a>	Antonov An-2R
<a href="#">12-JUN-2012</a>	Hawker Siddeley HS-748
<a href="#">16-JUN-2012</a>	ATR 42-320
<a href="#">18-JUN-2012</a>	Beech Beechjet 400A
<a href="#">20-JUN-2012</a>	Boeing 767-381ER
<a href="#">20-JUN-2012</a>	Grumman G-159 Gulfstream I
<a href="#">21-JUN-2012</a>	Fokker F-27 Friendship 400M
<a href="#">23-JUN-2012</a>	Cessna 208B Grand Caravan
<a href="#">27-JUN-2012</a>	Ilyushin IL-76MD

<a href="#">01-JUL-2012</a>	Lockheed C-130H Hercules	93-1458	USAF
<a href="#">04-JUL-2012</a>	Rockwell Sabreliner 75A	AE-175	Argentine Arm
<a href="#">04-JUL-2012</a>	DHC-8-402 Q400	N213WQ	United Express
<a href="#">09-JUL-2012</a>	DHC-6 Twin Otter 300	8Q-TMT	Trans Maldivia
<a href="#">12-JUL-2012</a>	Harbin Yunshuji Y-12 II	5T-MAE	Mauritanian AF
<a href="#">13-JUL-2012</a>	Gulfstream G-IV	N823GA	Universal Jet A
<a href="#">15-JUL-2012</a>	DC-9-83 (MD-83)	N110HM	American Airl
<a href="#">17-JUL-2012</a>	Canadair CRJ-200ER	N865AS	SkyWest Airlin
<a href="#">18-JUL-2012</a>	Boeing		
<a href="#">19-JUL-2012</a>	Antonov		
<a href="#">22-JUL-2012</a>	Let L-4		
<a href="#">28-JUL-2012</a>	Beech		
<a href="#">28-JUL-2012</a>	Beech		
<a href="#">02-AUG-2012</a>	Cessna		
<a href="#">06-AUG-2012</a>	Embra		
<a href="#">10-AUG-2012</a>	Bomba		

<a href="#">10-AUG-2012</a>	Airbus A330-343X	D-AIKE
<a href="#">16-AUG-2012</a>	Saab 2000 AEW&C	
<a href="#">17-AUG-2012</a>	Embraer ERJ-190	B-16825
<a href="#">19-AUG-2012</a>	Antonov An-26-100	ST-ARL
<a href="#">22-AUG-2012</a>	Let L-410UVP-E9	5Y-UVP
<a href="#">30-AUG-2012</a>	BN-2B-26 Islander	B-68801
<a href="#">31-AUG-2012</a>	ATR 42-500	AP-BHJ
<a href="#">09-SEP-2012</a>	Antonov An-2P	SP-FMA
<a href="#">10-SEP-2012</a>	DHC-8-301 Dash 8	C-GUON
<a href="#">12-SEP-2012</a>	Antonov An-28	RA-28715
<a href="#">15-SEP-2012</a>	Learjet 24D	D-CMMM
<a href="#">18-SEP-2012</a>	Beech Beechjet 400	N428JD
<a href="#">20-SEP-2012</a>	Airbus A320-232	YK-AKF
<a href="#">21-SEP-2012</a>	DHC-6 Twin Otter 300	9N-ABQ
<a href="#">22-SEP-2012</a>	Gulfstream G-V	N511QS
<a href="#">22-SEP-2012</a>	Hawker Beech 390 Premier IA	VT-UPN
<a href="#">28-SEP-2012</a>	Dornier 228-202	9N-AHA
<a href="#">29-SEP-2012</a>	Antonov An-2R	RA-33601
<a href="#">??-SEP-2012</a>	Antonov An-2R	RA-40220
<a href="#">04-OCT-2012</a>	Boeing 717-2BD	N894AT
<a href="#">07-OCT-2012</a>	Antonov An-12BP	ST-ARV
<a href="#">07-OCT-2012</a>	BN-2A-26 Islander	VP-MON
<a href="#">13-OCT-2012</a>	MD-11F	N988AR

# Coding Parameters



1. Are there fatalities? **Fatalities?**

YES: Go to #2

NO: Abandon

2. Was it a military aircraft?

YES: Abandon

NO: Go to #3

3. Was it a helicopter?

YES: Abandon

No: Open the file and look for #4

4. Is there an official accident investigation report from a national authority?

YES: Go to #5

No: Abandon

(EXCEPTION: If there are possible or probable language issues evident from the ASN Database page, go to #6. You can make a note of it for further investigation by a Subject Matter Expert.)

Is the Report available in English?

1. YES: Open it and look for evidence of communication or language issues. Go to #7.
2. NO: Go to #6

6. Is there any evidence for language issues apparent in the ANS Net Database? Evidence of multilingual communications?

1. Yes: INCLUDE this event in our database, for further investigation by SME.
2. No: abandon

7. Guide to reviewing the Accident Investigation Report

1. Search for Pilot nationality, citizenship, licensing agency, and language proficiency
2. Search for terms (Control F): English, Language, communication (s), proficiency, other language terms (Russian; German; Arabic); culture; crew resource management or CRM; language in training issues; readback.
3. Findings: Check "Findings" for causes of the event, for any related to language or communications.

## Accident investigation:

	Investigating agency:	NTSB
	Status:	Investigation completed
	Duration:	2 years and 7 months
	Accident number:	CEN13FA049
	Download report:	<a href="#">Summary report</a>

## **1. Is there any evidence for language issues apparent in the ANS Net Database? Evidence of multilingual communications?**

1. Yes: INCLUDE this event in our database, for further investigation by SME.
2. No: abandon

## **2. Guide to reviewing the Accident Investigation Report**

1. Search for Pilot nationality, citizenship, licensing agency, and language proficiency
2. Search for terms (Control F): English, Language, communication (s), proficiency, other language terms (Russian; German; Arabic); culture; crew resource management or CRM; language in training issues; readback.
3. Findings: Check “Findings” for causes of the event, for any related to language or communications.

Investigating  
Language

# 2011 - 2013

11/17/13	Russia	Boeing 737	Loss of Control	VQ-BBN	Tartarstan	50	Pilot lack of English and poor training
4/2/12	Russia	ATR 72-201	Icing-Loss of Control	VP-BYZ	UT Air	33	Language proficiency of crew
5/7/11	Indonesia	Xian MA60	CFIT	PK-MZK	Merpati Nusantara	25	Maint manual used non-stand Eng Avn Language had the potential to cause confusion.
7/13/11	Brasil	Let L-410UVP-E20	CRM, accident on go-around	PR-NOB	NOAR	16	Operation and maintenance manuals did not favor operation of aircraft due to non-stand english avn lang.
7/28/11	South Korea	Boeing 747-48EF	On board Fire, accident	HL7604	Asiana Airlines	2	ICAO level 4 for both pilots, 3 different countries ATC

# 2001 - 2010

1/25/10	Lebanon	Boeing 737-8AS (WL)	CRM, accident	ET-ANB	Ethiopa Airlines	90	Ethiopian flight crew/Lebanese ATC
3/6/09	India	National Aerospace Laboratories (NAL) Saras	Test flight engine failure		National Aerospace Laboratories (NAL)	3	Use of Non-English language in the cockpit
6/1/09	Atlantic Ocean	Airbus A330-203	Uncorrected Stall	F-GZCP	Air France	228	Operation manuals in French
10/22/09	Carribbean Netherlands	Britten-Norman BN-2A-26 Islander	Engine failure	PJ-SUN	Divi Divi Air	1	Egress procedures possibly misunderstood by English speaking passengers
8/20/08	Spain	McDonnell Douglas DC-9-82 (MD-82)	Stall on takeoff	EC-HFP	Spanair	154	Company Policy for manual language not specified
9/14/08	Russia	Boeing 737-505	Approach loss of spatial orientation	VP-BKO	Aeroflot-Nord	88	Language proficiency of crew
7/17/07	Sao Paulo	Airbus A320-233	runway excursion	PR-MBK	Aero República	187 +12	Standardization of language in manuals
9/29/06	Brasil	Boeing 737 Embraer ERJ-135BJ	Mid-Air	PR-GTD N600XL	GOL ExcelAire	154	Crew/ATC communications

# 2001 - 2010

8/6/05	Capo Gallo, Italy	ATR 72-202	ditching in sea	TS-LBB	Tuninter	16	Language proficiency of crew
8/14/05	Greece	Boeing 737-31S	Flight Crew incapacitati on	5B-DBY	Helios Airways	121	Language proficiency of crew
1/17/02	Colombia	Fairchild FH- 227E	CFIT	HC-AYM	Petroprodu ccion - Unidad de Aviacion	26	Distraction in cockpit with English translation from one pilot for the other
3/9/02	Italy	Antonov 2TP	CFIT	LY-AVD	Svedijos Prekés	3	radio-telephony (RT) qualification
4/15/02	Gimhae	Boeing 767- 2J6ER	CFIT	B-2552	Air China	129	radio-telephony (RTF)
5/25/02	Taiwan	Boeing 747-209B	Loss of Control	B-18255	Air China	225	RAP manual english translation
10/8/01	Italy	MD-87 Cessna	Runway Incursion	SE-DMA D-IEVX	SAS Private	110 +4	Dual languages simultaneously used
11/24/01	Switzerland	Avro RJ.100	CFIT	HB-IXM	Crossair	24	Dual Languages in cockpit



# 1991 -2000

1/10/00	Switzerland	Saab 340-B	Loss of Control	HB-AKK	Crosshair	10	Lack of Swiss language
3/24/00	Sri Lanka	Antonov 12BK	Fuel Starvation	RA-11302	Sky Cabs	3	Lack of communicability of the flight crew in English language
5/25/00	France	Shorts 330-200	Runway Incursion	G-SSWN	Streamline Aviation	1	Dual language confusion
10/31/00	Taiwan	B-747	Crash on takeoff	9V-SPK	Singapore Airlines	83	ATC failure to use correct phraseology
4/15/99	Shanghai	MD-11	Loss of Control	HL7373	Korean Air	8	???
11/12/99	Kosovo	ATR 42	CFIT	F-OHFV	Unuted Nations	24	???
8/6/97	Guam	B-747	CFIT	HL7468	KAL	238	Phraseology problems ATC/Crew
9/26/97	Indonesia	A-300	CFIT	PK-GAI	Garuda	234	ATC/Crew misunderstandings
12/17/97	Greece	Yakovlev 42	CFIT	UR-42334	Lvovskie avialinii	70	crew/ATC different native language
8/29/96	Norway	Tupolev 154M	CFIT	RA-85621	Vnukovo Air	141	Language proficiency of crew
11/12/96	India	Ilyushin 76/ Boeing 747-168B	Tupolo	UN-76435 HZ-AIH	Kazakhstan Saudi Arabian Air	349	Lack of communicability of the flight crew in English language

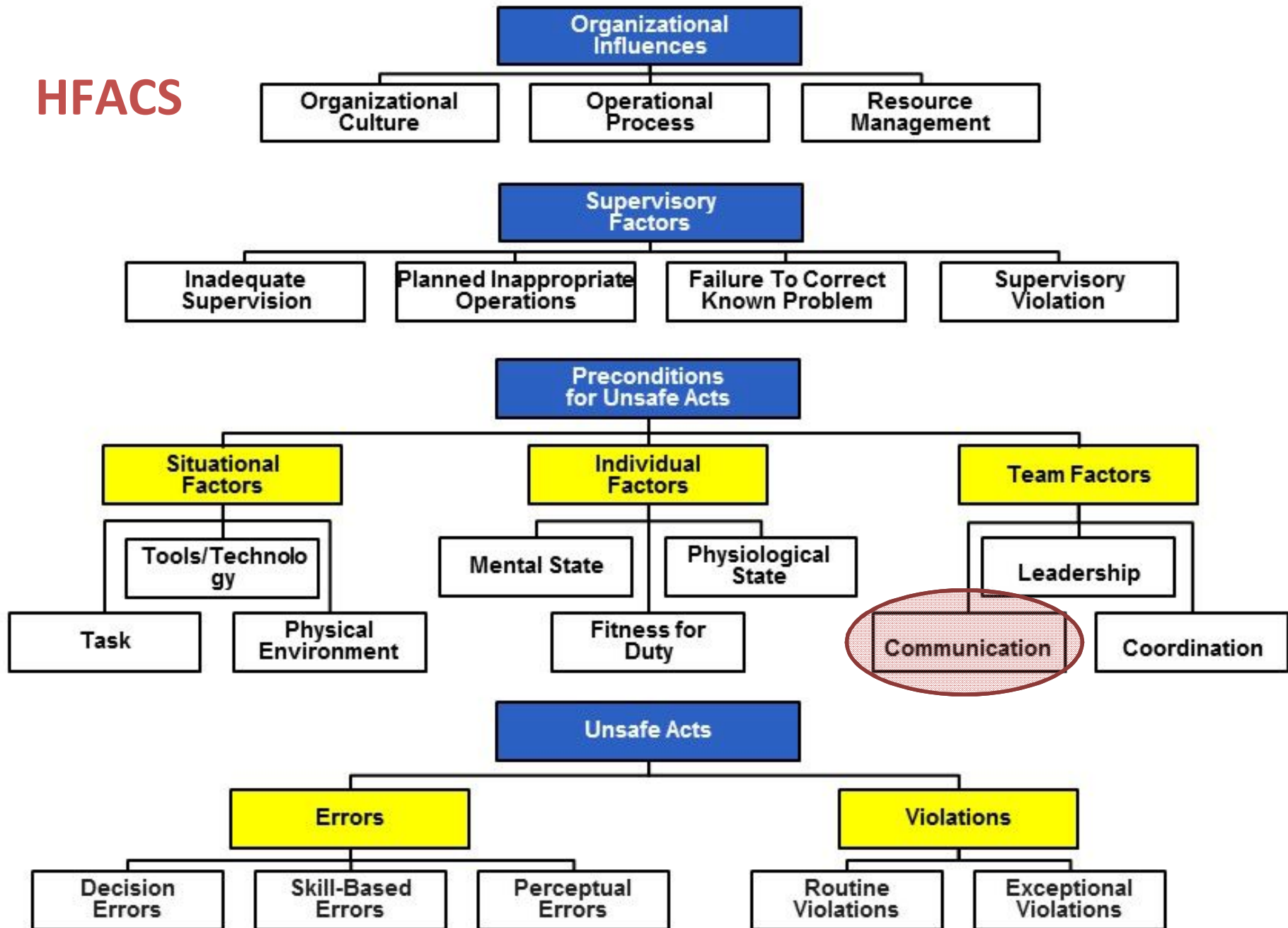
# 1991 -2000

12/20/95	Columbia	Boeing 757	CFIT	N651AA	AA	159	crew/ATC different native language
4/26/94	Japan	A-300	Loss of Control	B-1816	China Air	264	Possibly non understanding of auto pilot instrucion
12/21/94	U.K.	Boeing 737	CFIT	7T-VEE	Phoenix Avn	5	Non-standard language
3/5/93	Macedonia	Fokker 100	Icing-Loss of Control	PH-KXL	PalAir	83	Lack of communicability of the flight crew in English language
11/13/93	China	DC-9	CFIT	B-2141	China Northern	12	Chinese crew did not understand GPWS "pull up"
11/20/93	Macedonia	Yakovlev 42	CFIT	RA-43290	Saratov Airlines	116	crew/ATC different native language
1/20/92	France	Airbus 320	CFIT	F-GGED	Air Intl	87	Crew/ATC phraseology
7/31/92	Nepal	Airbus 310	CFIT	HS-TID	Thai Air	113	Lang issues ATC/Crew
10/4/92	Amsterdam	Boeing 747	Engine Seperation	4X-AXG	EL-AL Air	39	improper ATC phraseology

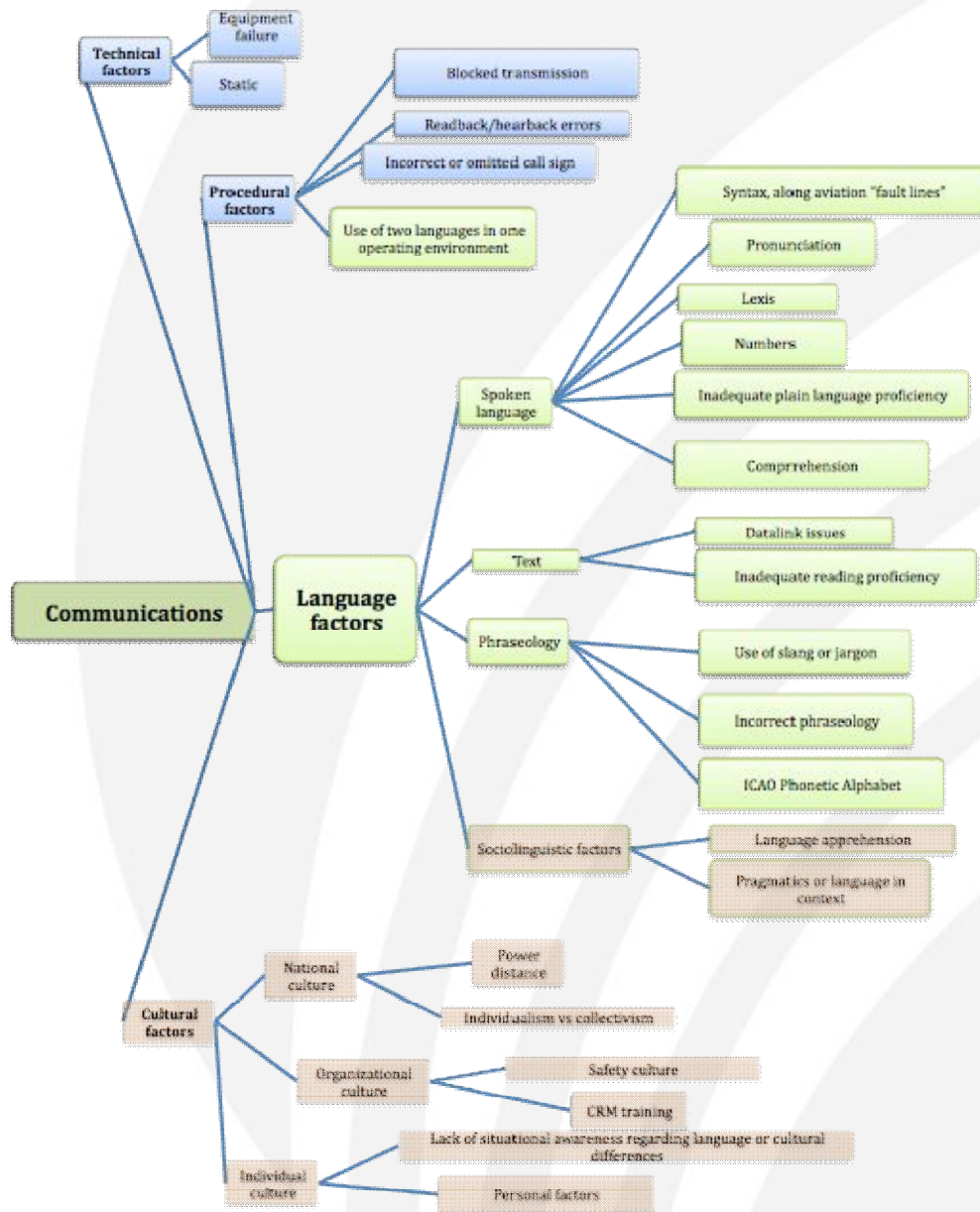
# Linguistic Review

- **Read the Accident Investigation Report**
  - Made notes: looked if evidence that language, communications, CRM, might have contributed
- **Discussion and Review**
- **Taxonomy**
  - **Used the Taxonomy to help categorize communication factors**
  - **Guided our analysis of the accident factors**

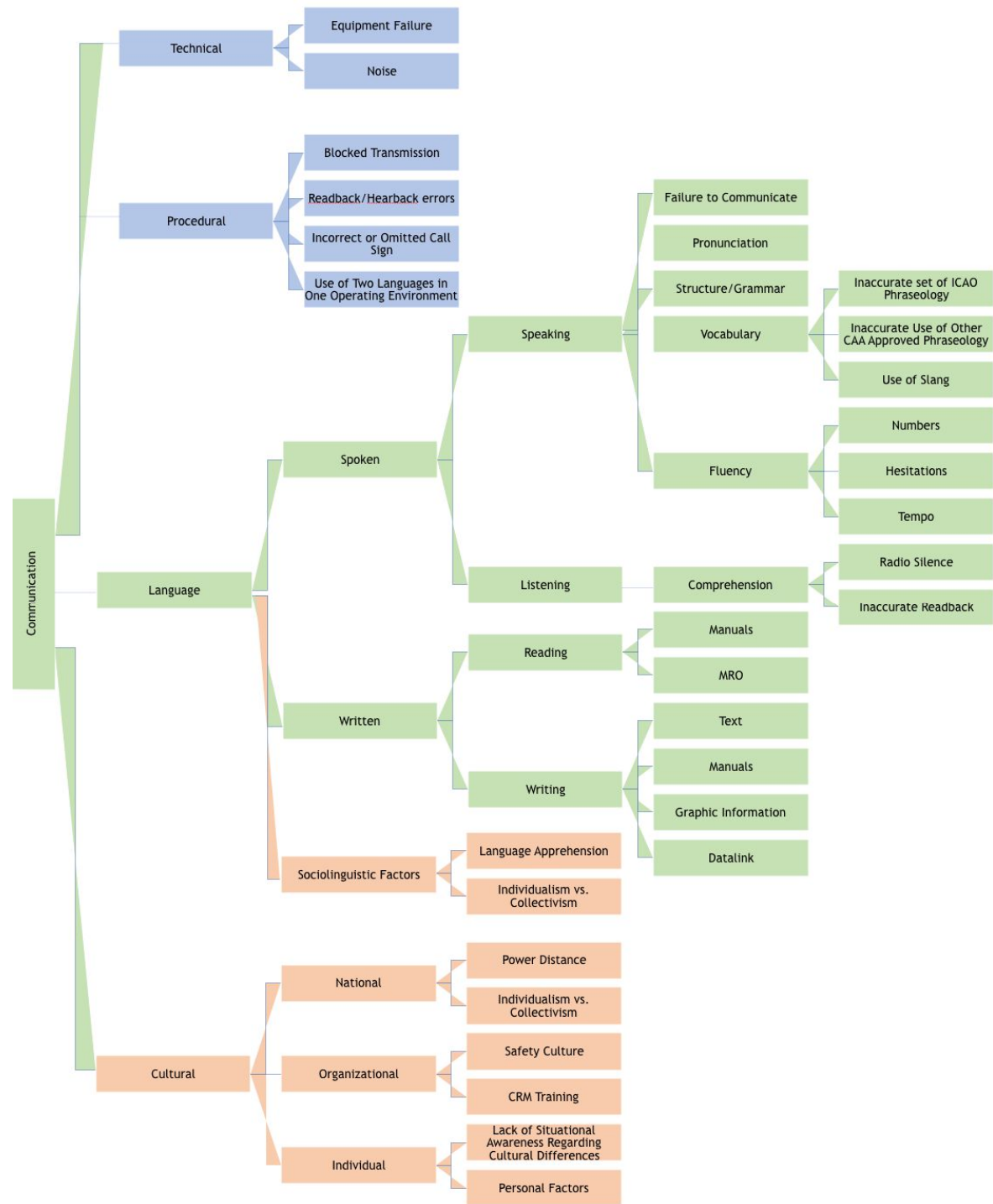
# HFACS

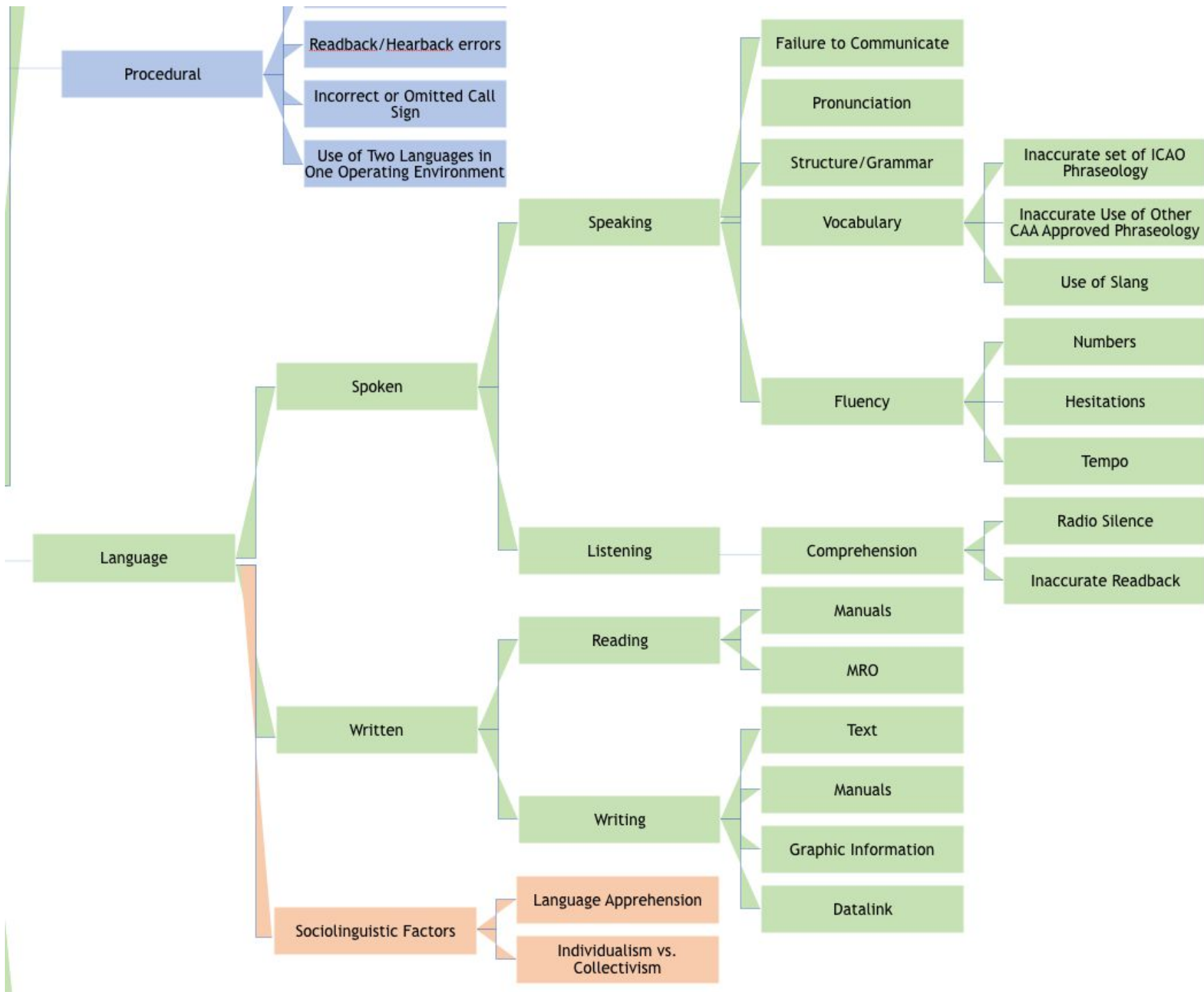


Considering Language as a Human Factor in Aviation



Investigating Language







Elizabeth  
Mathews  
AND ASSOCIATES





KAIB

KAIB/AAR F0201

# AIRCRAFT ACCIDENT REPORT

**129 Fatalities**

CONTROLLED FLIGHT INTO TERRAIN  
AIR CHINA INTERNATIONAL FLIGHT 129  
B767-200ER, B2552  
MOUNTAIN DOTDAE, GIMHAE  
APRIL 15, 2002

Investigating  
Language

# Controllers

- ➔ The CAAC investigation team presented opinions regarding ... the controller's lack of English proficiency, ...
- The Air force presented opinions ... on English language training conducted for controllers



Investigating  
Language

# Controller English...

- The local controller asked a question to the flight crew to confirm the position of the aircraft, however, the local controller did not issue any direct warning or advice based on his own subjective awareness of the situation.
- To the controller's question "Can you landing?" he replied "Roger, QFE three thousand, Air China 129," which shows that he did not communicate accurately with ATC.
- ... been far better for the local controller to have reminded like
  - ◆ "Caution, Mountainous Area," or
  - ◆ "Check your position immediately"
  - ◆ rather than asking questions such as "Can you landing?" and "Say position now."
- Then, the intentions of the controller would have been understood more clearly by the pilot.

# Pilots

... the captain held a Flight Crew English Certificate<sup>20</sup>, and passed the Simulated Air to Ground English Communication Test and Flight Specialty English Test.



...the first officer held a Flight Crew English Certificate, passed the Simulated Air to Ground English Communication Test and Flight Specialty English Test.

The second officer held a Flight Crew English Certificate, and passed the Simulated Air to Ground English Communication Test and Flight Specialty English Test.

The flight crew of flight 129 held English test certificates in accordance with the CCAR

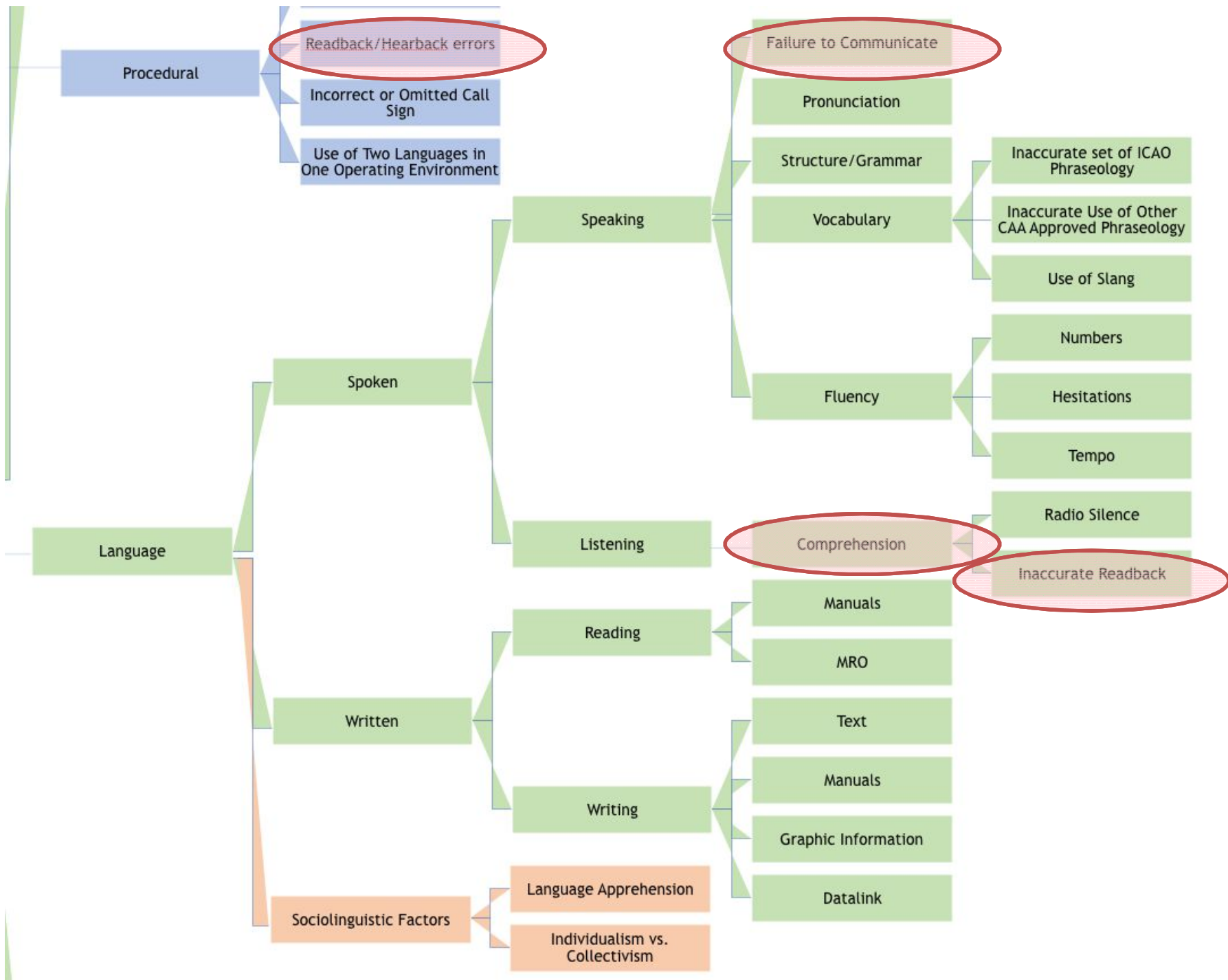
# Pilots...

- ...but the second officer's ATC communications including the frequency change to the tower instruction, etc. were not properly monitored by the captain or the first officer, resulting in untimely exchanges with the tower controllers.
- They also misunderstood and responded incorrectly to other ATC communications.
- The second officer, tasked with handling radio communications, did not reply correctly to the controller's instructions a number of times, however, the captain and first officer did not correct the second officer's inappropriate replies.

# Pilots...

- They also misunderstood and responded incorrectly to other ATC communications.
- The second officer, who was handling communications said, "Others keep listening, I came to Busan not too often."
- Judging from the second officer's inappropriate responses in a number of communications with ATC and also in relaying information to other crew members,

Air China may need to review its English language training program for flight crew on international flights



# Language related Findings or Recommendations

None

Investigating  
Language



# FINDINGS

- All significant conditions and events, causal and non-causal, found in the investigation

**International Society of Air Safety Investigators**

# CAUSE

- 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.

***Aircraft Accident Investigation***  
**Wood and Sweggins, 2006, p. 8**

Investigating  
Language



Elizabeth  
Mathews  
AND ASSOCIATES



**INTERSTATE AVIATION COMMITTEE**

**AIR ACCIDENT INVESTIGATION COMMISSION**

**FINAL REPORT  
ON RESULTS OF INVESTIGATION OF ACCIDENT**

Type of accident	Fatal accident
Type of aircraft	ATR72-201 aeroplane
Registration	VP-BYZ, Bermudas
Owner	BLF Limited
Operator	UTAir Aviation, JSC
Place of accident	1500 m from RWY 21 threshold; cross-track deviation about 400 m, Roschino aerodrome, Tyumen. Coordinates: N 57°09.440' E 065°16.000'
Date and time of accident	02.04.2012, 01:35 UTC (07:35 local time), day time

**33 Fatalities**

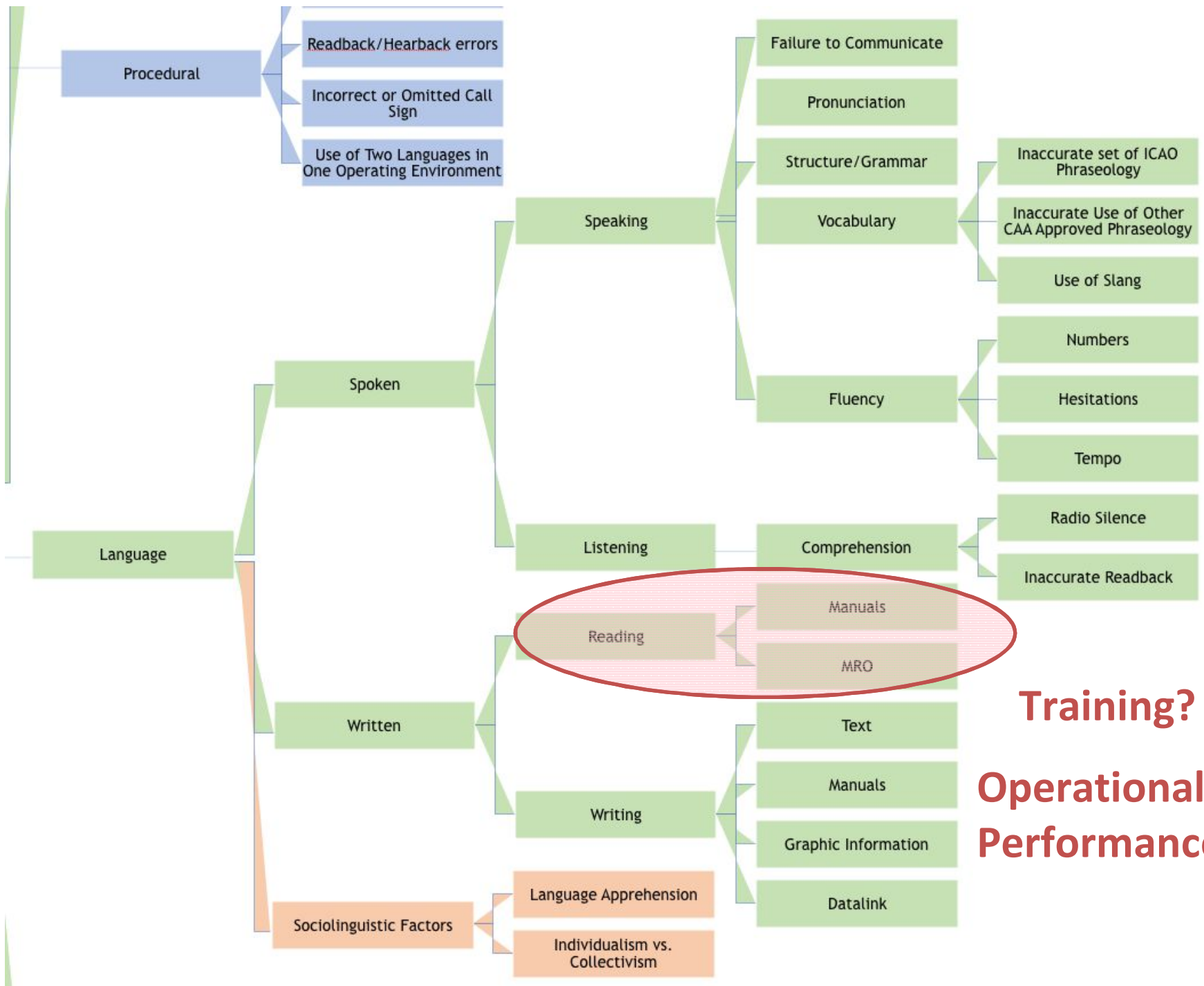
Investigating  
Language

# Facts

- Domestic Flight
- French manufactured ATR 72-201 twin engine turboprop
- Failed to de-ice wings
- Crashed in a stall shortly after takeoff
  
- According to the accident report, “The actual English proficiency of the [pilot in command] and [first officer] did not allow them to completely understand training materials presented in the English language.”

# Safety Recommendations

- Safety recommendations, paragraph 5. 1. 9 states:
- "To develop and Implement English language proficiency requirements for flight crew members that perform flights on A/C with documentation in English only,
- As well for personnel that provide maintenance and ground handling for those A/C."



**Training?**  
**Operational Performance**

2013: Russia

2012: Russia

2011: Indonesia  
Brasil  
South Korea

2010: Lebanon

2009: India

2008: Russia

2007: Brazil

2006: Brazil

2005: Greece

2002: Korea  
Taiwan

2001: Italy

2000: Switzerland  
Sri Lanka  
France

1997: Greece

1996: India

1995: Colombia

1990: USA

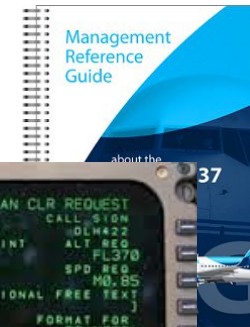
P-ATC	Flight Deck Comm	Reading Op and Flt manuals	Writing / Translation	Reading MRO manuals	Training-In EFL	CAA oversight	Airline oversight	Training provider oversight
		2012, 4/2 Russia			2012, 4/2 Russia	2012, 4/2 Russia	2012, 4/2 Russia	2012, 4/2 Russia
		2011, 07/13 Brazil	2011, 07/13 Brazil		2011, 07/13 Brazil	2011, 07/13 Brazil	2011, 07/13 Brazil	2011, 07/13 Brazil
		Czech-made aircraft, translated into English, used by Portuguese speakers. Training in ....						
		2011, 7/28 Korea						
		Selected wrong non-normal procedure checklist, in English as a foreign language.						
	2011, 05/07 Indonesia	2011, 05/07 Indonesia	2011, 05/07 Indonesia		2011, 05/07 Indonesia	2011, 05/07 Indonesia	2011, 05/07 Indonesia	2011, 05/07 Indonesia
	No checklist reading or crew briefing”	Chinese aircraft, manual translated into English	“FCOM and AMM used non-standard English Aviation Language, p. 26		“Inadequacy in training program...” ...Chinese instructors, all using English			
		2011, 07/13 Brazil	2011, 07/13 Brazil	2011, 05/07 Indonesia	2011, 07/13 Brazil	2011, 07/13 Brazil	2011, 07/13 Brazil	2011, 07/13 Brazil
		Czech-made aircraft, translated into English, used by Portuguese speakers.						





P-ATC	Flight Deck Comm	Reading Op and Flt manuals	Writing / Translation	Reading MRO manuals	Training-In EFL	CAA oversight	Airline oversight	Training provider oversight
-------	------------------	----------------------------	-----------------------	---------------------	-----------------	---------------	-------------------	-----------------------------

- Flight Deck Communications/CRM
- Reading Operational and Flight Manuals
- Writing / Translation
- Reading MRO Manuals
- Training in EFL



# Language

As a possible contributing or latent factor in aviation accidents should be investigated with the same degree of methodical and systematic thoroughness with which all other human and operational factors are considered.