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Cleared to Disconnect?
A Study of the Interaction between Airline Pilots and
Line Maintenance Engineers

A thesis presented in partial fulfilment of the requirements for the degree of
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*To those who fly aeroplanes
and those who maintain them*

Abstract

Accurate information regarding the maintenance status of an aircraft is essential for safe and efficient airline operations, yet there is evidence to suggest that pilots and line maintenance engineers do not always communicate effectively with each other. To date the majority of this evidence has been anecdotal, and formal studies have focused primarily on the shortcomings of the aircraft logbook as a communication medium. Despite the notion that poor communication between these two groups can potentially have undesirable consequences, there has been little discussion about how this might manifest within an airline environment. The studies undertaken for this research examined three distinct aspects of the pilot-maintenance interface: 1) the intergroup relationship between airline pilots and line maintenance engineers, 2) operational radio communications between airline pilots and line maintenance engineers, and 3) the effects of deficient pilot-maintenance communication on aircraft operations and flight safety.

Thematically analysed discourse from a series of focus groups held at a large New Zealand airline, found that communication difficulties are primarily the result of an interrelating set of organisational, physical and psychosocial barriers, all of which influence the nature of the intergroup relationship between pilots and line maintenance engineers. The use of Interaction Process Analysis (IPA) to examine radio calls between pilots and maintenance personnel identified that while the two groups share similar communication patterns and styles, indications of these barriers were present within their communication exchanges. The effects of deficient communication were then examined using data from the United States Aviation Safety Reporting System (ASRS). Using Correspondence Analysis (CA) to map associations between deficient pilot-maintenance communication and adverse outcomes, evidence was found that poor communication can be associated with both schedule disruptions and potential safety ramifications.

Ultimately, this research has important implications for airlines, particularly given the degree to which organisational factors can influence the efficacy of communication between these two groups. In light of the findings which suggest that problematic interactions between pilots and maintenance personnel can have both commercial implications and pose a threat to flight safety, it is recommended that airlines give consideration to facilitating joint Crew Resource Management (CRM) training for these two groups.

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Glossary of Aviation Terms

AAIB	Air Accidents Investigation Branch (UK)
ACARS	Aircraft Communication Addressing and Reporting System
AME	Aircraft Maintenance Engineer
AMEL	Aircraft Maintenance Engineer Licence
AMT	Aircraft Maintenance Technician
AOA	Angle of Attack
AOG	Aircraft on Ground ('grounded' due to a defect)
AQP	Advanced Qualification Program
ASRS	Aviation Safety Reporting System
ATC	Air Traffic Control
ATPL	Air Transport Pilot Licence
ATSB	Australian Transport Safety Bureau
BASI	Bureau of Air Safety Investigation (Australia)
CAA	Civil Aviation Authority (UK)
CAANZ	Civil Aviation Authority of New Zealand
CAR	Civil Aviation Rules (NZ)
CASA	Civil Aviation Safety Authority (Australia)
CRM	Crew Resource Management
DDG	Dispatch Deviation Guide
EGPWS	Enhanced Ground Proximity Warning System
EGT	Exhaust Gas Temperature
FAA	Federal Aviation Authority (United States)
FO	First Officer
FOD	Foreign Object Damage
GPWS	Ground Proximity Warning System
HF	High Frequency
ICAO	International Civil Aviation Organization
IDG	Integrated Drive Generator
LAME	Licensed Aircraft Maintenance Engineer
MEL	Minimum Equipment List
MHz	Mega Hertz
MOC	Maintenance Operations Control / Maintenance Operations Centre
MRM	Maintenance Resource Management
NATS	National Air Traffic Services (UK)
NIGS	Nose-In Guidance System
NTS	Non-Technical Skills
NTSB	National Transportation Safety Board (US)
OTP	On-Time Performance
NASA	National Aeronautics and Space Administration
PF	Pilot Flying
PM	Pilot Monitoring
PIC	Pilot in Command
QRH	Quick Reference Handbook
RTF	Radio Telephony
SatPhone	Satellite Phone
TAG	Trans-cockpit Authority Gradient
TAT	Total Air Temperature
VHF	Very High Frequency