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# **Examining the Influence of Error Climate on Aviation Maintenance Performance**

A thesis presented in partial fulfilment of the requirements for the degree  
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## **Abstract**

Errors and violations are an everyday occurrence but in safety focused industries, such as aviation maintenance, the implications can be grave. To address the urgent need to provide empirical evidence of precursors of unsafe acts, the present study examined the role of error climate in aviation maintenance performance. Survey data were collected from 189 Technical Trade personnel in the Royal New Zealand Air Force.

Error climate is a relatively new construct that refers to employees shared perceptions of organisational practices regarding errors and is divided into two types, error management climate (EMC) and error aversion climate (EAC). An EMC acknowledges the inevitability of error and has practices that deal effectively with error. An error aversion climate (EAC) conversely, denies error and is characterised by a fear of error and a reluctance to discuss error.

The current study revealed two facets of EAC, these were error strain and covering up errors. EAC and EMC were negatively correlated. Higher levels of EMC were associated with better supervision and psychological health and lower levels of EAC, violations and errors. Higher levels of EAC were associated with the opposite pattern of findings, more violations and errors, worse psychological health, poorer supervision and lower levels of EMC. Two types of violations were found, situational violations which were related to getting the job done in the face of situational constraints and routine violations which reflected rule defiance. Significant predictors of situational violations were routine violations, covering up errors, stress, position (seniority) and general psychological health while significant predictors of routine violations were situational violations and fatigue. Significant predictors of errors were routine violations and position. The effect of error climate on errors was partially mediated by violations. This result is consistent with that of safety climate which is a well established predictor of unsafe acts. Unexpectedly, psychological health did not act as a mediator. These findings suggest that error climate is an important organisational factor in safety and aviation maintenance performance that warrants further examination.

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# Table of Contents

<b>Abstract</b> .....	<b>i</b>
<b>Acknowledgements</b> .....	<b>ii</b>
<b>List of Tables</b> .....	<b>vi</b>
<b>List of Figures</b> .....	<b>vii</b>
<b>Glossary</b> .....	<b>viii</b>
<b>Chapter One: Introduction</b> .....	<b>1</b>
Errors.....	2
<i>Defining Errors</i> .....	2
<i>Types of Error</i> .....	2
<i>The Distinction between Errors and Violations</i> .....	4
Violations .....	5
<i>Defining Violations</i> .....	5
<i>Types of intentional non-malevolent violations</i> .....	6
Unsafe Acts .....	8
<i>Active and Latent Errors</i> .....	8
<b>Chapter Two: Approaches to Error</b> .....	<b>11</b>
Error Consequences .....	11
Approaches to Error .....	12
Error Prevention vs. Error Management.....	21
Error Prevention and Error Management in Aviation.....	23
<b>Chapter Three: Error Climate</b> .....	<b>28</b>
Organisational Climate .....	28
<i>The role of organisational practices and procedures</i> .....	30
<i>Facets of organisational climate</i> .....	32
Safety Climate.....	33
Error Climate.....	37
Supervision.....	44

Psychological Health.....	48
Violations .....	51
Summary of Hypotheses: .....	55
<b>Chapter Four: Method .....</b>	<b>56</b>
<i>Participants</i> .....	56
<i>Measures</i> .....	59
<i>Procedure</i> .....	62
<i>Data Analysis</i> . .....	63
<b>Chapter Five: Results .....</b>	<b>64</b>
<i>Sample Description</i> .....	64
<i>Demographic Group Differences</i> .....	67
<i>Correlation Analysis</i> .....	68
Hypothesis Testing.....	70
<i>Regression</i> .....	70
Prediction of Errors .....	75
Prediction of Violations .....	76
<i>Situational violations</i> .....	76
<i>Routine violations</i> .....	76
<b>Chapter Six: Discussion.....</b>	<b>78</b>
Implications of the Findings .....	82
Limitations of this Study.....	83
Directions for future research.....	84
Conclusion .....	85
<b>References:.....</b>	<b>86</b>
<b>Appendices .....</b>	<b>97</b>
<b>Appendix A: Organisational description .....</b>	<b>98</b>
Rank Structure.....	99
Training of Technical Personnel .....	99

**Appendix B: Measures used in this Study ..... 101**  
**Appendix C: Factor loadings for the EAC Scale ..... 105**  
**Appendix D: Factor loadings for Violations ..... 106**

## **List of Tables**

Table 1: Principles of Error Management.....	20
Table 2: Three Layers of Error Mastery and Error Aversion Climates .....	40
Table 3: Demographics .....	58
Table 4: Summary Statistics (N=189).....	65
Table 5: Examples of error information provided by participants.....	65
Table 6: Demographic Variables as Predictors of Fatigue.....	68
Table 7: Correlation Matrix .....	69
Table 8: Violations as a Mediator of the Relationship between EMC and Errors.....	72
Table 9: Violations as a Mediator of the Relationship between EAC and Errors .....	73
Table 10: Violations as a Mediator of the Covering up Errors and Errors Relationship.....	74
Table 11: Prediction of Errors.....	75
Table 12: Prediction of Situational violations.....	76
Table 13: Prediction of Routine violations .....	77



## **List of Figures**

Figure 1: Continuum of Violations .....	6
Figure 2: Unsafe Acts .....	10
Figure 3: Bow Tie Model of Error Defences .....	22
Figure 4: A model of flight crew error management .....	25
Figure 5: Error climate as a facet of organisational and safety climate .....	28
Figure 6: Empirical model of safety climate relationships .....	36
Figure 7: Continuum of Error Climates .....	40
Figure 8: Theorised model of associations for the current study .....	43
Figure 9: Revised Figure 8 showing supported pathways .....	71
Figure 10: Training and Promotion Process for an Avionics Technician .....	100

## Glossary

### Technical Trades

#### AEROMWKR



#### ARMMECH



#### ARMTECH



#### ACFTMECH



#### ACFTTECH



#### AVMECH



#### AVTECH



**Aeronautical Metal Worker:** Responsible for the manufacture and repair of a variety of equipment, using various metals and alloys.

**Armament Mechanic:** Completed Primary Trade Training and currently undertaking on the job training, but yet to complete Advanced Trade Training to become an Armament Technician.

**Armament Technician:** Responsible for maintaining weapons systems, small arms, explosives demolition, countermeasures and guided missiles for our fleet of aircraft. As well as loading and arming aircraft weapons systems for operational tasks, ARMTECHs perform ground handling and aeronautical maintenance duties.

**Aircraft Mechanic:** Completed Primary Trade Training and currently undertaking on the job training, but yet to complete Advanced Trade Training to become an Aircraft Technician.

**Aircraft Technician:** Responsible for maintaining all aircraft mechanical systems used on RNZAF aircraft including: aircraft structures, flight controls, engines, propellers, helicopter rotors, hydraulics, pneumatics, landing gear and fuel.

**Avionics Mechanic:** Completed Primary Trade Training and currently undertaking on the job training, but yet to complete Advanced Trade Training to become an Avionics Technician.

**Avionics Technician:** Responsible for all aircraft electronic and electrical systems and components, including radars, radios, navigation equipment, flight instruments, infra red

technology, Night Vision Goggles (NVGs) and electrical generation.

### **COMPMECH**



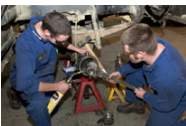
**Composites Mechanic:** Completed Primary Trade Training and currently undertaking on the job training, but yet to complete Advanced Trade Training to become an Composites Technician.

### **COMPTECH**



**Composites Technician:** Responsible for the manufacture and repair of aircraft and aircraft support equipment, and composite and metal-bonded components

### **GSEMECH**



**Ground Support Equipment Mechanic:** Completed Primary Trade Training and currently undertaking on the job training, but yet to complete Advanced Trade Training to become an Ground Support Equipment Technician.

### **GSETECH**



**Ground Support Equipment Technician:** Responsible for maintaining the ground-based mechanical equipment required to support RNZAF aircraft operations e.g. motor vehicles, refuelling equipment, hydraulic rigs, hoists and other small engine equipment.

### **Machinist**



**Machinist:** Responsible for the manufacture and repair of aeronautical and non-aeronautical equipment, using a range of complex and technically advanced machines and tools.

### **SSMECH**



**Safety and Surface Mechanic:** Completed Primary Trade Training and currently undertaking on the job training, but yet to complete Advanced Trade Training to become a Safety and Surface Technician.

### **SSTECH**



**Safety and Surface Technician:** Responsible for servicing, maintaining and repairing the RNZAF's aeronautical safety and survival equipment (e.g. parachutes, aircrew protective equipment, life rafts) as well as applying, maintaining and repairing the painted surfaces of aircraft and components.

**STT:**

**Small Technical Trades:** Normally includes Composites, Aeronautical Metal Workers, Ground Support Equipment Technicians and Machinists, but for the purposes of this study Safety and Surface Technicians and Armament Technicians are also included as Small Technical Trades.

Pictures and role descriptions downloaded from <http://www.stepup.dixs.mil.nz>

## **Roles, Abbreviations and Descriptions:**

<b>AC</b>	Aircraftsman
<b>Chain of Command</b>	Hierarchical reporting structure
<b>CPL</b>	Corporal
<b>DASH</b>	Directorate of Air Force Safety and Health
<b>FEGs</b>	Force Element Groups (FEGs) - the four operational squadrons (units) within the RNZAF – 3 Squadron (Helicopters), 5 Squadron (Maritime), 6 Squadron (Naval Support Helicopters) and 40 Squadron (Transport).
<b>JNCO</b>	Junior Non Commissioned Officer – Corporal
<b>LAC</b>	Leading Aircraftsman
<b>LOSA</b>	Line Operations Safety Audit: The review by expert observers of crew behaviours and situational factors on normal flights.
<b>MFCs</b>	Maintenance Flight Commanders
<b>MSS</b>	Maintenance Support Squadron
<b>NCO</b>	Non Commissioned Officer, includes ranks from Corporal to Warrant Officer.
<b>NZDF</b>	New Zealand Defence Force
<b>Re-enlist</b>	Re-join a military organisation
<b>RNZAF</b>	Royal New Zealand Air Force
<b>SGT</b>	Sergeant
<b>SNCO</b>	Senior Non Commissioned Officer – Sergeant, Flight Sergeant or Warrant Officer. The only SNCOs involved in this study were Sergeants.
<b>Squadron</b>	Unit or division of an Air Force
<b>Tasking</b>	Assigned job or task, usually refers to a flight
<b>Wing</b>	A Wing is a large division of an Air Force and is comprised of Squadrons.