

FINAL YEAR PROJECT REPORT
DIPLOMA IN MECHANICAL ENGINEERING
FACULTY OF MECHANICAL ENGINEERING
INSTITUT TEKNOLOGI MARA
SHAH ALAM

MATERIAL FAILURE IN AIRCRAFT INDUSTRY

BY
ZAIRULAILY BT MOHD ZAIN
ZAINON AHMAD
OCTOBER 1997

ACKNOWLEDGEMENT

We would like to express our heartiest gratitude to our Project Adviser, Ir. Dr. Mohamad Nor Berhan for the help and guidance in completing this project. We are also very grateful to the following people for their assistance.

Malaysia Airline System for their co-operation and the opportunity for us to have a visit and to gain more knowledge in the subject " Material Failure In Aircraft ".

Tentera Udara Di-Raja Malaysia (TUDM) for their co-operation in giving us informations regarding our research subject.

Lastly, we would like to express our gratitude to Malaysian Helicopter Services Aviation Sdn. Bhd. (MHS) for their co-operation in answering the questionnaire set about " Material Failure In Aircraft " that were sent to them.

Thank you

Zairulaily Bt Mohd Zain

Zainon Ahmad

Faculty of Mechanical Engineering

ITM, Shah Alam.

ABSTRACT

This project is basically based on a study made on materials failure in aircraft. The scope of project has been to look in various part of the aircraft including the materials types and typical failures that occurs in aircraft components.

A particular attention was made to Malaysian Airline System (MAS) where typical failures and preventive measures taken in order to minimise or prevent further damage. The economic issue on material failure in aircraft was also looked into.

Finally, conclusion and suggestion were made to this interesting and beneficial studies.

TABLE OF CONTENTS

ACKNOWLEDGEMENT	i
ABSTRACT	ii
TABLE OF CONTENTS	iii
CHAPTER 1 : INTRODUCTION OF THE PROJECT	
1.0 Introduction	1
1.1 Objective Of Study	2
1.2 Scope Of Study	2
CHAPTER 2 : MATERIAL FAILURE	
2.1 Definition of Failure	3
2.2 Types of Material	3
2.3 Types of Failure	14
2.4 Why Material Fail ?	20
CHAPTER 3 : MATERIAL FAILURE IN AIRCRAFT	
3.1 Introduction	22
3.2 Investigation Procedure of Material Failure	23
3.3 Typical Failure of Material In Aircraft	29
3.4 Failure Prevention	44

CHAPTER 4 : ECONOMIC ISSUE ON MATERIAL FAILURE IN AIRCRAFT

4.0 Introduction	46
4.1 Cost of Inspection And Testing	47
4.2 Cost of Material Replacement	48
4.3 Cost of Overhaul Work / Repairement	49
4.4 Cost of Failure Prevention	50

CHAPTER 5 : DISCUSSION AND CONCLUSION

5.1 Discussion	51
5.2 Conclusion	53

REFERENCE