

# Defect Analysis on Boeing 737-400 Skin Panel Rivet Row Aft Ward Fuselage

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*Abstract: Non-destructive testing defect analysis has been long used as a lead to safeguard against an incident due to damage limitation. This is especially vital for the aging aircraft to protection against possible issue respectively. Defect analysis using non-destructive testing mean to be conducted on Boeing 737-400 skin panel rivet row aft ward fuselage. Project were conducted at University Kuala Lumpur Malaysian Institute of Aviation Technology (UNIKL MIAT). The purpose of this project is to determine percentage of material loss in between rivet row of Boeing 737-400 skin panel from BS 747 to BS 967, crack inspection on Boeing 737-400 skin panel rivet row aft ward fuselage and to analyses collected data for usability of rivet panel on Boeing from 737-400 BS 747 to BS 967. The result for the inspection carried out on the fuselage BS 747 to BS 967 shows that the subsurface has exceed 30% of material loss, crack has exceeded 0.2 inch and conductivity are not within limitation as per the Aerospace Material Specification AMS2658C. Such data for future references about its reference point data on the current state and condition of the aircraft were created and the aircraft require further investigation and possible repair need to be carried out to ensure safety for students and lecturer doing practical on the aircraft.*

*Index Terms: Non-destructive Testing (NDT), defect analysis, skin panel rivet, Boeing 737-400*

## I. INTRODUCTION

In Non-Destructive Test (NDT) philological the word “defect” is fittingly applied only to a state which will affect with the safe or satisfactory service of part in question. There are many types of NDT techniques such as Eddy Current Testing (ECT), Penetrate Testing (PT) Magnetic Testing (MT) Ultrasonic Testing (UT) and Radiographic Testing (RT) [1]. ECT, which is referring to a typical electromagnetic method to inspect conductive materials, would be utilized significantly in this study. All these testing did not damage to the materials or specimens. In-service defects could ascend due to components operating under extreme conditions, poor preventive maintenance programme of the components and systems or due to some outside cause like foreign object damage (FOD). The notion of whether or not NDT methods would be successful or not rely heavily on the engineering material types, how the components were manufactured, and when the flaw of the product would appear [2].

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## A. Corrosion

In general, corrosion progress depends on the aircraft age, its main environment such as the hangar where it is parked, and its maintenance schedule [3]. This subject report discusses the analysis of an aging aircraft (Boeing 737-400) on its corrosion, conductivity and crack. Boeing 737-400 at UNIKL MIAT does not have database for previous defect history. It is parked at the apron for a very long time which is exposed to high temperature, humidity and supposedly it should be covered from being exposed towards weather. Hence, it is essential to create such data for future references about its reference point data on the current state and condition of the aircraft. A task analysis of inspection by the author was carried out as part of the constant measure against crack, conductivity and corrosion of the aircraft.

## B. Objectives

- To determine percentage of material loss in between rivet row of Boeing 737-400 skin panel BS 747 to BS 967.
- To conduct crack inspection on Boeing 737-400 skin panel rivet row aft ward fuselage.
- Analyses collected data for usability of rivet panel on Boeing 737-400 BS 747 to BS 967.

## C. Research Goals

Inspection method used to determine the percentage of material loss in between rivet row is by using the eddy current testing. The data is recorded if there is defect on between the rivet row along the Boeing 737-400 skin panel BS 747 to BS 967. As the results obtained, the collected data is analyzed for the usability of the rivet row on the aircraft and clarify the safeties of personnel to get inside the aircraft to do practical session.

## D. Scope and Limitation

Scope for my final year project is limited to selected aircraft which is Boeing 737-400 BS 747 to BS 967 skin panel rivet row aft ward fuselage by using eddy current testing 90° probe and donut probe. Other application might not produce the result intended due to limited use of equipment and adequate instrument and samples.

## E. Summary

As a summary NDT technique that had been done at modern aircraft should be also tested on aging aircraft as to ensure the serviceability and airworthiness of the aircraft that follows the standard regulation.