

Post-Maintenance Flight Test as a Mechanism of Motion in MIRCE Mechanics

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Abstract

MIRCE Mechanics is a part of MIRCE Science that focuses on the scientific understanding and description of the physical phenomena and human rules that govern the motion of functionable system types through MIRCE Space[1]. A full understanding of the mechanisms that influence this motion through MIRCE Space is essential for accurately predicting the functionability performance of functionable system types using MIRCE Science. According to the 5th axiom of MIRCE Science, the probability that a completed maintenance task introduces faults or errors is greater than zero. To reduce the probability of introducing undetected maintenance errors and their consequential impact on the system operational process, the concept of the Post-Maintenance Flight Tests (PMFT) is used in aviation industry. Consequently, the main objective of this paper is to critically assess these types of maintenance verification tests and their impact efficacy on the functionability performance, as understood through the application of MIRCE Science. The physical reality of inducing errors during maintenance and their consequences on post-maintenance flight is illustrated using an incident that regrettably took the lives of two pilots, when their Piper PA 46-350P, N962DA, crashed into the Spokane River on May 7, 2015, following an attempted landing at Felts Field Airport in Spokane, Washington, USA

1. Introduction

2. Post-Maintenance Flight Test

3. Is Post Maintenance Flight Testing Necessary?

4. Preparation for the Post Maintenance Flight Test

Rule 1
Rule 2
Rule 3
Rule 4
Rule 5
Rule 6

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5. An Example of Maintenance Induced Catastrophic Error

6. Conclusions

According to the 5th axiom of MIRCE Science, the probability that a maintenance task completed contains a faults or errors is greater than zero. Hence, MIRCE Mechanics, as a part of MIRCE Science, focuses on the scientific understanding and description of the physical phenomena and human rules that govern the motion of functionable system types through MIRCE Space [1]. A full understanding of the mechanisms of

the motion is essential for accurate predictions of functionality performance of functionable system types facilitated by MIRCE Science.

To reduce the probability of existence of undetected maintenance errors and their consequences on the system operational process, the concept of the PMFT is used in aviation industry. Thus, the main objective of this paper was to analyse this type of maintenance tests and their impact on the functionality performance in aviation, on one hand, and to inform functionality engineers and managers in other industries to consider similar tests, on the other.

The physical reality of inducing errors during maintenance and their consequences on a post-maintenance flight is illustrated through an incident that took the lives of two pilots, when their Piper PA 46-350P, N962DA, crashed into the Spokane River on May 7, 2015, following an attempted landing at Felts Field Airport in Spokane, Washington, USA

Arguably, among the most challenging and potentially hazardous flights a pilot can undertake are post-maintenance flights tests The NTSB database contains dozens of incidents in which post-maintenance flights ended up tragically, often because the pre-flight chores were rushed or carelessly executed. Hence, the closing question is:

“Could the probability of the detection of maintenance induced errors be increased by appropriate design solutions, rather than leaving them to be detected during the potentially risky PMFT?”

7. References

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- [4] [Aarons, R., Two Chances Lost”, Apr 27, 2017 Richard N. Aarons | Business & Commercial Aviation
- [5] Misrigged Flying Controls: Fatal Maintenance Check Flight Accident Posted by Aerossurance on Oct 3, 2016 in Accidents & Incidents, Design & Certification, Fixed Wing, Human Factors / Performance, Maintenance / Continuing Airworthiness / CAMOs, Safety Management
- [6] NTSB Identification: WPR15FA158, 14 CFR Part 91: General Aviation Accident occurred Thursday, May 07, 2015 in Spokane, WA, Probable Cause Approval Date: 09/22/2016, Aircraft: PIPER PA 46 350P, registration: N962DA Injuries: 2 Fatal.

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