

Non Destructive Testing in Fixed-Wing Aircraft Maintenance: Insights from Record Analysis

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In the realm of aviation, ensuring the structural integrity and operational safety of fixed-wing aircraft is a paramount concern. Non Destructive Testing (NDT) stands as a critical methodology in this endeavor, underlined by its increasing prominence as reflected in the stringent regulations and detailed guidelines established by aviation authorities and aircraft manufacturers. This study undertakes an in-depth analysis of the maintenance records of fixed-wing aircraft to scrutinize the current application and effectiveness of NDT in real-world aircraft maintenance. It pays particular attention to NDT procedures executed during routine Phased Inspections and more specialized Special Inspections. The latter, triggered under specific or abnormal operational conditions, are delineated from Phased Inspections by distinct criteria outlined in regulatory guidelines. The research methodically categorizes and analyzes the types and frequencies of defects identified through each inspection type and corresponding NDT method. Additionally, it probes into the evolution of NDT practices and the detection patterns of defects as the service years of aircraft accumulate, with a specific focus on Special Inspections. Through this exploration, the study aims to provide a understanding of the practical application of NDT in the maintenance of aircraft. It seeks to contribute valuable insights into the continuous improvement of NDT protocols, thereby enhancing the efficacy of maintenance practices and reinforcing the overarching commitment to aircraft safety and reliability.