Course M-7/R-6

Non Destructive Inspection Techniques for Technicians and Inspectors

Course Summary

This five-day course is designed for the repair technician, fabricator, or inspector tasked with identifying and quantifying defects in new or damaged composite panels using the latest equipment, methods, and techniques. The course is very “hands-on” in nature, and quite busy. The instruction is performed by an ASNT certified Level III engineer and is flexible to adapting to the students needs.

Introduction

The most commonly used NDI techniques will be discussed and some will be practiced in class. These techniques include Visual Inspection, Tap Testing (both manual and instrumented tap testing), Resonance Bond Testing, Acoustic Emission testing, Radiographic testing, and Ultrasonic Inspection. Some of the more sophisticated techniques, such as Pulsed Thermography, Fourier Transform Infrared (FTIR), Laser Shearography, and Laser Holographic Interferometry may be presented, but not actively used in the class. The students will inspect fiber-reinforced composite panels, of both solid laminate and sandwich construction. These panels will include deliberate defects in specified areas and will be inspected using different techniques to determine which methods or techniques work best for detecting the different types of defects. Through actual hands-on practice, the students will learn what methods work best and what may not work as well on different structures and with different types of defects. The goal is for the student to obtain a thorough understanding of why these differences exist, and which methods of inspection are most applicable to a specific structure. Training begins with a discussion of the basic elements of composite materials, and construction techniques. This leads into conversation about common flaws, defects, and typical damage scenarios, including hidden damage issues. Other topics include a review of damage types and causes, as well as damage from unexpected sources such as water, paint stripper, hydraulic fluid, and low-intensity impacts. The inherent Pros and Cons of all techniques and lessons learned will be discussed in detail; including a discussion about defects which cannot currently be detected with existing NDI methods or techniques.

Topics

Key Lecture Topics:

- Introduction to composite materials and processes.
- Fundamentals of solid laminate & sandwich panel construction.
- Types of defects and potential causes.
- Damage detection and assessment.
- Inspecting for hidden damage.
- Inspecting known damage.
- Overview of NDI methods and techniques.
- Classroom introduction to specific workshop exercises.

Workshop Exercises:

- Students will perform visual inspection, manual tap testing, digital tap testing, ultrasonic and resonance bond testing on the composite panels to find flaws and defects on simulated and actual composite structures.
- The class will also inspect secondarily bonded composite specimens with intentional defects at the bond interface utilizing different methods and techniques to determine best practices applicable for bondline inspection.

Course Benefits

This course will give the attendees a good working knowledge of ultrasonic inspection techniques along with an overview of complimentary and comparative NDI/NDT techniques used in industry.

Prerequisites

M-1/R-1 or equivalent experience is preferred but not required.

Teaching Method

Active classroom lecture and workshop exercises: 65% Theory and 35% Practical

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