Course R-5
Composite Windblade Repair

Course Summary

This 5-day course is prerequisite for the R-15 Advanced Windblade Repair course and is designed for both factory and field technicians, inspectors, and supervisors responsible for performing structural repairs to composite wind blades.

Introduction

This class is devoted to hands-on repair practices with the appropriate balance of classroom time dedicated to learning about materials and processing relative to both the structure and the repair. This course promotes and utilizes multi-person team repair concepts similar to those done both in the factory and in the field. Students will be grouped in teams of two to work together on these projects. In this course the students will first be challenged with determining the extent of damage to Fiber Reinforced Plastic (FRP) sandwich panels and then will perform damage removal and proper repair preparation. Finally the student teams will perform repairs to reconstruct the damaged areas in order to match the fiber axial loads through the damaged area in the structure. This fundamental repair approach will be repeated again with another panel, so as to promote additional hands-on practice with the appropriate tools and equipment used in both factory and field repairs. During this repair, the student teams will be introduced to the latest hot-bond repair equipment specifically designed for the windblade repair industry. This equipment will then be used to perform hot-bond repairs on the structure, with the students learning how to position, secure, and control large area heat blankets in accordance with standard industry procedures.

Topics

Key Lecture Topics:

- Overview of common composite materials and processes.
- Fundamentals of solid laminate and sandwich panel construction methods.
- Fundamentals of vacuum bagging: materials and processes.
    - The use of bleeder, breather schedules, debulking concepts, leak checking, etc.
- Damage detection methods used to assess the damaged structure.
- Overview of damage removal and repair methods and techniques.
- Classroom introduction to specific workshop exercises, introducing the repair approach that will be utilized.

Workshop Exercises:

- Each team will perform visual inspection and tap testing on a FRP sandwich panel to outline the damaged area.
- Each team will perform damage removal and preparation of the exposed surface of a FRP sandwich panel for repairs. This will be repeated on another section of the panel for additional practice.
- Each team will then perform structural repairs to the panels using fiberglass dry cloth and liquid epoxy resin for both ambient temperature cure repairs and hot bond repairs.

Course Benefits

Attendees will learn best practices for performing proper repairs to composite windblades,nacelles, and other structures.

Prerequisites

None required - The M-1/R-1 Advanced Composite Structures: Fabrication and Damage Repair course is suggested for in-depth subject knowledge.

Teaching Method

Active classroom lecture and workshop exercises: 25% Theory and 75% Practical

CEU

3.4