



COMPOSITES & ADVANCED MATERIALS LAB

Research engineers and lab technicians in the Composites & Advanced Materials Lab perform lay-up and bonding operations to understand the effects of heat, moisture, contamination and repairs on advanced materials. The lab also has a fully capable machine shop for preparing panels and works directly with NIAR's Mechanical Test Lab.

CAPABILITIES

- Lay-up
- Material equivalence testing
- Qualification testing
- Fatigue, stress and tension testing
- Mechanical testing/ design allowable generation
- Quality assurance testing
- Investigation of adhesive behavior
- Bonded repair
- Damage resistance & tolerance of sandwich panels
- Laminate allowable generation
- Aging studies
- Adhesive characterization of fatigued and damaged bonded joints
- Characterization of composite repair
- Full-scale structural testing

EQUIPMENT

- Autoclaves
 - 3' x 5', 800°, 400 PSI
 - 3' x 6', 800°, 200 PSI
 - 6' x 12', 800°, 200 PSI
- Multiple environmental chambers and conditioning environments
- Dynamic mechanical analysis units
- Differential scanning calorimetry
- Thermogravimetric analyzer
- Optical microscope with video analysis
- Stereoscope x350 with hand-held inspection unit
- Filament winding machine (4-axis)
- 3 Programmable walk-in ovens (500° F)
- Ultrasonic NDI units to perform pulse and echo and TTU scans with curved panel capability
- Phased array
- RTM resin pumps
- Walk-in freezers (-20° F)
- Lay-up rooms
- Machine shop specialized for composite material processing
- Instron Dynatup 8250 with environmental chamber
- X-ray diffractometer
- Coordinate measuring machine

- Phoenix 4000 SEM and energy dispersive system
- Thermal shock chamber (-160° F to 500° F)
- FTIR

PROJECTS

- Bonded Repair of Composite Airframe Laminate and Sandwich Structures
- Adhesive Joint Characterization and Standards
- Effects of Defects and NDI Standards
- Material Qualification and Equivalency
- Industry-Directed Special Projects and Element Allowables

CLIENTS

- Boeing
- Cessna
- Beechcraft
- Lockheed Martin
- Bombardier Learjet
- FAA

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