

USAF Applications of Repair and Supportability of Advanced Composite



Phillip Larson
AFRL/RXS-OLH



What The ACO Does



AFI-21-105, "Aerospace Equipment Structural Maintenance"

- Provide Engineering and Technical Assistance to Composites Users
- Manage Technical Order 1-1-690, *General Advanced Composite Repair Manual*
- Provide and Support Advanced Composites Training
- Support Advanced Composites Health & Safety Issues
- Assist Technology Transfer





Challenge of Repair & Supportability



This Is What We Need To Be Able To Fix On A Composite Airplane

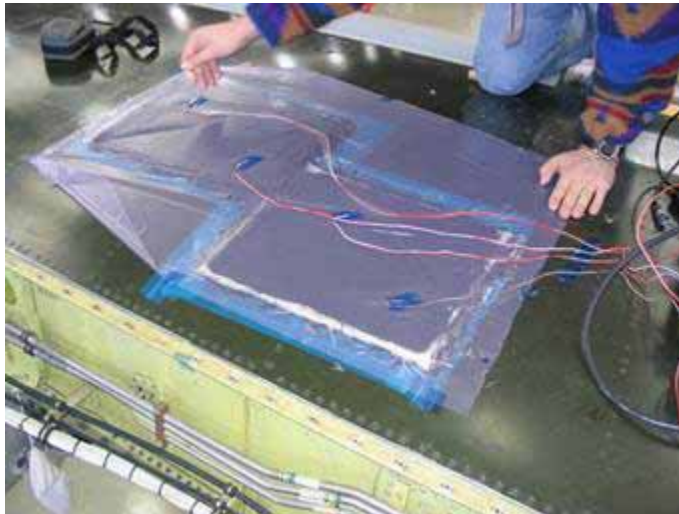




Challenge of Repair & Supportability



Repair of Small Damage And Bonded Patches For Corrosion Repair Is Also Very Important





Process Dependency

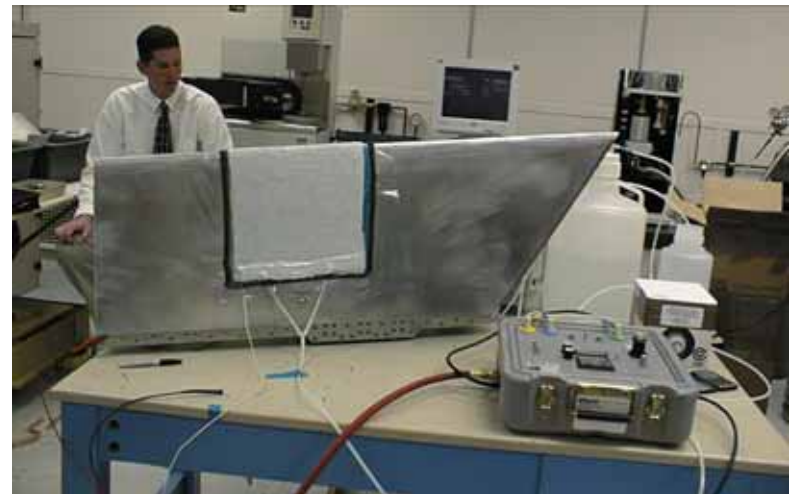


Process Repeatability

- Key Element for Repaired Parts Continued Airworthiness
- Facilities Contribute to Quality Repairs

Example Is Bonded Structural Repair

- Surface Prep Is Vital
- Simplified Engineering And Processes





Repair Facilities



- **Some Lessons Learned About Repair Facilities**
 - **Not Really That Expensive**
 - **Proper Planning Saves Huge Costs**
 - **Good Housekeeping Is Most Important Factor For A Cleanroom**





Maintenance Training



- **USAF Schoolhouse Is Prime For AF Training**
- **On the Job Training Issues**
 - **Infrequencies of repairs**
 - **Currency on equipment and processes**





Continued Airworthiness (Repair)



- **Materials**
 - Easier, Faster, Cheaper; Especially Need Long Shelf Lives
 - Substitute Materials
- **Processes**
 - More Generic Processes, Better Defined
- **Training**
 - Concurrency, Just In Time (JIT) Training



Lessons Learned



- **Maintenance Environment Is Main Cause Of Damage**
 - **Need To Train Many Types Of Workers, Not Just Repair Mechanics**
- **Most Facilities Clean Enough- Good Housekeeping Is The Most Important Thing With The Air Conditioned Facility**
- **Information Flow For Procurement Of Materials And Tools Needs To Be Improved**
- **Training Content Is Good But Need To Improve Delivery Methods And Availability**



Closing Thoughts



- **Trends for Supportability**
 - **Current Trend For USAF Is A Greater Reliance On Contractor Logistic Support, OEM Substantiating Data**
 - **Government Has To Depend On Industry Groups For Specifications And Standards**
- **USAF Composite Applications Have a Good History to Date**