FAA/EASA/Industry Composite Transport Workshop

Federal Aviation Administration

Fatigue, Damage Tolerance, Maintenance and Crashworthiness

Topics to be Covered

Tuesday May 17 – 8 a.m.-5:30 p.m.

- Composite Safety & Certification Initiatives (FAA & EASA)
- Composite Structural Engineering Course: Proof of Structure Model
  (with emphasis on the Fatigue & Damage Tolerance section)
- Composite Structural Engineering Course: Maintenance Interface Modules
- Open Industry Forum
- Industry Perspectives on Composite & Metal Interface Issues
- Airline Field Experiences

Wednesday May 18 – 8 a.m.-5:30 p.m.

- Composite & Metal Interface Issues
- High Energy, Wide Area, Blunt Impact
- Damage in Sandwich Construction
- Bonded Repair Size Limits

Thursday May 19 – 8 a.m.-3:30 p.m.

- Composite Structural Engineering Course Crashworthiness Module
- Open Industry Forum
- Crashworthiness Certification Protocol
- Industry Perspectives on Transport Composite Fuselage Crashworthiness

Who is in Attendance

- Arab Civil Aviation Committee – 2
- Airbus – 4
- ATR France
- Bishop GmbH
- Boeing – 3
- Bombardier – 2
- Civil Aviation Administration of China – 2
- Cessna – 3
- Civil Aviation Authority of Israel
- Delta Airlines – 3
- European Aviation Safety Agency
- Embraer – 3
- FAA – 13
- Fokker Aerostructures
- Gulfstream Aerospace – 2
- Hawker Beechcraft
- Japan Civil Aviation Bureau
- JCH Consultants
- Mitsubishi Aircraft
- National Institute for Aviation Research, WSU – 2
- NSE Composites – 2
- Spirit AeroSystems – 2
- SW Composites
- Civil Aviation – Transport Canada
- University of California – San Diego
- United Airlines
- University of Washington
- NASA
- Lockheed Martin

2011 Composite Transport Workshop Objectives

Areas of Interest: Fatigue, Damage Tolerance, Maintenance & Crashworthiness

- Review recent composite guidance developments and ongoing initiatives supporting workshop areas of interest
- Review progress in developing FAA Level II Composite Structural Engineering Safety Awareness Course Modules in workshop areas of interest
- Discuss technical issues, field experiences, and evolving industry practices for the following composite initiatives:
  - Composite and metal interface issues
  - High energy, wide area, blunt impact
  - Damage in sandwich construction
  - Bonded repair size limits
  - Crashworthiness certification protocol
- Collect participant inputs to support composite initiatives

TUESDAY, MAY 17

Composite Safety & Certification Initiatives (FAA and EASA)		
8:00-8:15	Welcome Introduction/ Workshop Objectives	Larry Ilcewicz & Curtis Davies (FAA)
8:15-9:00	FAA Composite Safety & Certification Initiatives and Recent AC Developments	Lester Cheng, Rusty Jones and Larry Ilcewicz (FAA)
9:00-9:30	EASA Composite Initiatives and the Process Used for AMC 20-29 Development	Simon Waite (EASA)
9:30-10:15	2011 FAA Interface with Industry & Other Regulatory Org. to Support Active Composite Educational and Guidance Initiatives	Larry Ilcewicz (FAA)
10:15-10:30	BREAK	
Composite Structural Engineering Course: Proof of Structure Module (with emphasis Fatigue and Damage Tolerance)		
10:30-11:00	Course Outline and Objectives for the Proof of Structure Module	Tom Walker & D.M. Hoyt (NSE Composites) & Steve Ward (SW Composites)
11:00-11:30	Detailed Review and Discussion of Fatigue Damage Tolerance Content	Tom Walker, D.M. Hoyt (NSE Composites)
11:30-Noon	Open Forum with Workshop Participants	
Noon-12:30	LUNCH	
Composite Structural Engineering Course: Maintenance Interface Modules		
1:30-2:15	Progress with Maintenance Interface Modules	Mike Borgman (Spirit AeroSystems)
Open Industry Forum		
2:15-3:15	Safety Awareness Education Needs and Composite Industry Designee Qualifications for Composite Transport Applications	
3:15-3:30	BREAK	
Industry Perspectives on Composite and Metal Interface Issues		
3:30-4:00	Fatigue and Damage Tolerance Reliability and Large Scale Testing	Allen Fawcett, David Polland and Kevin Davis (Boeing)
4:00-4:30	Methodology for Large Scale Testing Protocol for Structures that Contain Both Metal and Composite Structures	Chantal Fualdes (Airbus)
Airline Field Experiences		
4:30-5:30	Airline Field Experiences of Relevance to May 18 Sessions 2, 3 and 4	Ray Kaiser & Todd Herrington (Delta Airlines) & Eric Chesmar (United Airlines)

WEDNESDAY MAY 18

Session 1: Composite and Metal Interface Issues		
8:00-8:45	Benchmarking the Composite Fatigue Test	John Halpin (JCH Consultants)
8:45-9:30	Fatigue Test Data for Composite Design Variables, With and Without Damage	Waruna Seneviratne, John Tomblin (NIAR,WSU)
9:30-10:30	Open Forum with Workshop Participants	
10:00-10:15	BREAK	
Session 2: High Energy, Wide Area, Blunt Impact		
10:15-10:40	FAA Perspectives on Awareness and Reporting of Significant Impact Incidents Involving Composite Airframe Structures	Larry Ilcewicz (FAA)
10:40-11:10	Impact Threat Analysis and Testing Methodology	Chantal Fualdes (Airbus)
11:10-11:40	Impact Damage Criteria for Transport Aircraft Structure	Kevin Davis and David Polland (Boeing)
11:40-12:00	Blunt Impact on Composite-Metallic Aircraft Structure: Overview of the EASA/ Bishop GmbH Research Project	Zoltan Mikulik (Bishop GmbH)
12:00-12:30	High Energy Blunt Impact Damage on Composite Aircraft Structure	Hyonny Kim (UCSD)
12:30-1:15	LUNCH	
Session 3: Damage in Sandwich Construction		
1:15-1:45	CACRC Design Guidelines (Problems with Sandwich Damage)	Eric Chesmar (United Airlines)
1:45-2:30	Proposed Strategy for Compliance Validation with 25.571 at Amendment 132 for Honeycomb Fuselage Structure	Don Wernert (Hawker Beechcraft)
2:30-3:15	Damage in Sandwich Construction: Best Practices for Prevention/Detection	Roland Thevenin (Airbus)
3:15-3:30	BREAK	
Session 4: Bonded Repair Size Limits		
3:30-4:00	Airline Perspective on the Constraints of Bonded Repair Size Limits	Todd Herrington (Delta Airlines)
4:00-4:30	Bonded Repair Reliability and Failsafety	Allen Fawcett, David Polland, Kevin Davis (Boeing)
4:30-5:30	Experience with Large Bonded Repairs: Observations on Classification, Substantiation, Approvals and Fleet Performance	Mike Borgmann, John Welch (Spirit AeroSystems)

THURSDAY MAY 19

Composite Structural Engineering Course: Crashworthiness Module		
8:00-9:00	Crashworthiness Module: Overall Outline, Objectives and Content Development	Paolo Feraboli (University of Washington)
9:00-9:30	Course Contribution in Selected Areas: 1) Seat Crash Analysis & Certification 2) Rotorcraft Experience in Crash Certification	Joseph Pellettiere (FAA)
9:30-10:00	Course Contribution in Selected Areas: Aircraft Certification Considerations	Allan Abramowitz (FAA)
10:00-10:15	BREAK	
Open Industry Forum		
10:15-10:45	Perspective on Rules, Guidance and Standards Needs	
10:45-11:15	Composites Transport Crashworthiness Considerations	
Session 5a: Crashworthiness Certification Protocol		
11:15-11:45	Crash Dynamics Summary	Joseph Pellettiere (FAA)
11:45-12:15	Building Block Methodology to Support the Crashworthiness Evaluation of Composite Aircraft Structures	Gerardo Olivares (NIAR/WSU), Allan Abramowitz (FAA)
Session 5b: Crashworthiness Certification Protocol		
1:15-1:45	Crashworthiness Evaluation of Aircraft Structures – Analytical and Computational Methods	Gerardo Olivares (NIAR/WSU), Allan Abramowitz (FAA)
1:45-2:15`	Analysis Calibration and Validation of Analytical Models for Composite Structures Subjected to Dynamic Loading	Mostafa Rassaian (Boeing)
Industry Perspectives on Transport Composite Fuselage Crashworthiness		
2:15-2:45	Analysis and Test Protocol for Dynamic Impact Phenomenon	Mchel Mahe (Airbus)
2:45-3:15	Crashworthiness of Transport Structure	Kevin Davis (Boeing)
3:15-3:30	**Recap/Actions/Closure**	Larry Ilcewicz, Curtis Davies (FAA)