FAA / CAAs “Composite Safety & Certification Meeting”
- Meeting Purpose & Objectives -

Larry Ilcewicz
Lester Cheng
FAA Composite Team

Singapore, Singapore
September 01-04, 2015
Composite Safety & Certification Initiatives  
- AVS Composite Plan -

**Objectives**

1) Work with industry, other govt. agencies and academia to ensure safe and efficient deployment of composite technologies used in existing & future aircraft

2) Update policies, advisory circulars, training, and detailed background used to support standardized composite industry practices
FAA Approach to Composite Safety & Certification Initiatives

**Evolving**

1) Certification & Service History
2) Industry Interface
3) Focused RE&D
4) New Technology Considerations

**Mature**

Rules & General Guidance

- Policy Statements
- Advisory Circulars
- FARs

Detailed Background
(Various forms of technology transfer)

- Training (Workshops, Courses, and Videos)
- JAMS: Joint Advanced Materials & Structures Center of Excellence
- Public Documents and Standards (e.g., CMH-17, SAE AMS, Contractor Reports)

#) Order of Influence for Unwritten Internal Policies

---

FAA / CAAs Composite Safety & Certification Meeting
CAA of Singapore, Singapore; Sep 01-04, 2015

Federal Aviation Administration
Important Teammates

- Partnerships with industry have been essential, including working groups & standards org. (e.g., CMH-17, SAE P-17, CACRC, ASTM, SAMPE, AGATE, SATS, RITA, SAS/IAB/AACE)

- EASA, TCCA and other foreign regulators

- NASA research and other support
  - Significant research support since 1970/1980s
  - AA587, A300-600 accident investigation

- DOD and DARPA research
  - NCAMP support to material standardization
Composite Technical Thrust Areas

Advancements depend on close integration between areas

Material Control, Standardization and Shared Databases

Structural Substantiation
- Advances in analysis & test building blocks
- Statistical significance
- Environmental effects
- Manufacturing integration

Progress to Date 2012
- AC 20-107B (9/09)
- 3 other Advisory Circulars
- 7 Policy Memos/Statements
- 16 Workshops
- 4 Training Initiatives
- 2 Technical Documents
- CMH-17 Updates
- SAE CACRC Standards
- ~60 FAA R&D Reports

Damage Tolerance and Maintenance Practices
- Critical defects (impact & mfg.)
- Bonded structure & repair issues
- Fatigue & damage considerations
- Life assessment (tests & analyses)
- Structural test & analysis protocol
- Accelerated testing
- Structural tear-down aging studies
- NDI damage metrics
- Equivalent levels of safety
- Training standards

Bonded Joint Processing Issues

Advanced Material Forms and Processes

Flammability & Crashworthiness

Support to future cabin safety initiatives
Overview of AVS Composite Plan

- Based on safety management approach
- The Plans are linked to:
  - Best Industry Practices
  - Research
  - Certification and field experiences
  - Projected technology advances in aircraft structure
- Priority given to structural issues, related manufacturing procedures and maintenance practices coming from service experience and industry input.

<table>
<thead>
<tr>
<th>Continued Operational Safety (COS)</th>
<th>Certification Efficiency (CE)</th>
<th>Workforce Education (WE)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COS A</strong>: Bonding Initiatives</td>
<td><em>CE A</em>: Hybrid F&amp;DT Substantiation</td>
<td><em>WE A</em>: Composite Manufacturing Technology</td>
</tr>
<tr>
<td>- Bonded Repair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Bonding Quality Control</td>
<td><em>CE B</em>: Advanced Composite Maintenance</td>
<td><em>WE B</em>: Composite Structure Technology</td>
</tr>
<tr>
<td>- Sandwich Disbond Growth</td>
<td><em>CE C</em>: Composite Structural Modifications</td>
<td><em>WE C</em>: Composite Maintenance Technology</td>
</tr>
<tr>
<td><strong>COS B</strong>: HEWABI</td>
<td><em>CE D</em>: Composite Quality Assurance</td>
<td>Composite Basics</td>
</tr>
<tr>
<td><strong>COS C</strong>: Failure Analysis of Composites Subjected to Fire</td>
<td><em>CE E</em>: Bonded Structure Guidance</td>
<td>Composite DER</td>
</tr>
<tr>
<td></td>
<td><em>CE F</em>: General Composite Structure Guidance</td>
<td></td>
</tr>
<tr>
<td><strong>Support to future COS Initiatives</strong></td>
<td>Transport Crashworthiness</td>
<td></td>
</tr>
<tr>
<td>Aging</td>
<td>Lightning Protection</td>
<td></td>
</tr>
<tr>
<td>Composite Aircraft Teardown</td>
<td>CMH-17 Revision H</td>
<td></td>
</tr>
</tbody>
</table>
**FAA / CAAs “Composite Meeting” - Background & Purpose -**

**Background & Purpose**

– FAA have extensively engaged in the efforts of promoting Composite Safety, Certification Efficiency and Workforce Education since 1999.

– Many of these efforts have involved the participation of EASA & TCCA. Many CAAs missed the exposures.

– As the composite airplanes (e.g., Boeing 787, Airbus 350) are increasingly operated in the global environment, we would like to establish a link with the CAAs who missed the engagement.

– This link would provide the very needed safety management guidance for the operation of composite airplanes.
FAA / CAAs “Composite Meeting”
- Meeting Objectives (Sept. 1-4, 2015) -

- Meeting Objectives
  - To provide brief description of available FAA composite policy, guidance and training.
  - To provide introductory review on composite certification and compliance methods as currently documented in Composite Material Handbook 17 (CMH-17).
  - To review the general composite guidance included in FAA Advisory Circular 20-107B (AC 20-107B).
  - To share FAA workforce education strategy/plan and introduce the Level II safety awareness courses.
  - To outline FAA AVS Composite Plans for additional developments to be completed over the next seven years.
Meeting Agenda

Tue, Sep. 1 (AM)  FAA Composite Initiatives
- FAA Composite Plan: Background, Accomplishments
- Global Efforts: Approach, Industry Interface, Standards

Tue, Sep. 1 (PM)  Composite Material Handbook 17 (CMH-17)
- CMH-17, History, Organization and Revision G Updates
- Vol. 3, Ch. 3: Aircraft Structure Certification and Compliance

Wed, Sep. 2  Composite Aircraft Structure (AC 20-107B)
- Development of AC 20-107B
- CAA Programs and Experiences
- AC 20-107B Technical Review (Paragraph 1 through 8)
Meeting Agenda (continued)

Thu, Sep. 3 (AM) Composite Aircraft Structure (AC 20-107B), Continued

- AC 20-107B Technical Review (Paragraph 8 through 11)
- Recap and Discussion (Future AC 20-107C Plans)

Thu, Sep. 3 (PM) CAA Programs and Selected FAA Technical Areas

- CAA Presentations and Discussions
- Material Qualification, Bonding, Severe Impact Threats

Fri, Sep. 4 (AM) FAA Composite Plans and Workforce Education Review

- Forward Looking AVS Composite Plans
- Safety Awareness Courses (Maintenance, Structural Engineering, and Manufacturing)
CAA Presentations

• **Sep 02 (Tue) AM**
  – [CAA of New Zealand]
  – [CAA of Israel]
  – [CAAC of China]
  – [CAD of Hong Kong]
  – [CAA of Singapore]

• **Sep 03 (Wed) PM**
  – [CAA of Taiwan]
  – [DGCA of Turkey]
  – [DGCA of India]
  – [DCA of Malaysia]
  – [DGCA of Indonesia]
  – [CAA of Korea]
FAA / CAAs Composite Safety & Certification Meeting

• Thanks to CAAS/SAA for Hosting Meeting.
• Thanks to CAAs for Participation.
• Link to Participants Talent Pool.
• Global Aviation Safety is Our Mutually Shared Purpose & Objective.