BYLAWS
COMMERCIAL AIRCRAFT COMPOSITE REPAIR COMMITTEE (CACRC)

1. DEFINITION OF THE PROBLEM

Standardization of repair and modification of composite aircraft structure is becoming increasingly important to aircraft operators. Composites in aircraft structure have high maintenance, inspection, repair, and modification cost.

2. HISTORY

The A4A/IATA/SAE CACRC was established in 1991 through the merger of separate Composite Repair Task Forces (CRTF) under the A4A (formerly Airlines for America, which was formerly ATA), International Air Transport Association (IATA), and the Society of Automotive Engineers (SAE). The SAE CRTF was established in 1983 under the AMS Composite Committee. During its existence, the SAE CRTF published Aerospace Recommended Practices and had 11 other draft documents in various stages of development. In cooperation with members of the A4A, the SAE CRTF provided early input to the FAA on AC145-6. The IATA CRTF was established in 1988 under the auspices of the Engineering Maintenance Advisory Committee. The IATA CRTF published “Guidance Material for the Design, Maintenance, Inspection and Repair of Thermosetting Epoxy Matrix Composite Aircraft Structures”. The IATA CRTF also formed an OEM working group on standardization of carbon/epoxy 120 C cure wet lay-up system. In April 1990, the IATA CRTF defined topics for future activity and recommended one coordinated approach to address issues related to composite repair. In September of the same year, an “Equal Partner” meeting was held between the IATA and SAE CRTFs offering the first sign of a commitment to a joint initiative. In January 1991, the newly formed A4A CRTF supported the “one coordinated effort” concept and defined areas of U.S. airline concern.

Representatives of the A4A, IATA and SAE CRTFs met in March 1991 (Montreal) and in May 1991 (Schiphol East) to propose an organization and structure for a coordinated composite repair standardization effort. Titled the “ATA/IATA/SAE Commercial Aircraft Composite Repair Committee” (CACRC), the representatives reached agreement on terms of reference, organizational levels, Chair, administration and definition of task groups based on airline hurts surveys. Each organization agreed to terminate their existing CRTFs and the first meeting of the newly formed CACRC was conducted on December 3-5, 1991 in Washington DC.

In January 2021, at the request of the FAA, the CACRC agreed to expand the charter and statement of work to include the modification of composite aircraft structure. The technology, processes, analysis methods, and inspection for modifications, including secondary bonding, co-bonding, and bolting details to composite structure, are based on the technology and experience developed for repairs.

3. CHARTER

The charter of the SAE Commercial Aircraft Composite Repair Committee (CACRC) is to promote repair and modification standardization and to provide guidance to composite and bonded structure maintenance providers, airlines, regulators, material suppliers and OEMs. This will be accomplished through developing and publishing AIR, ARP, AMS and other guidance documents. These guidance documents are developed to enhance safety and reduce aircraft ownership cost.
4. ORGANIZATIONS AND STRUCTURE

The CACRC is organized into three levels with the following responsibilities:

**Level 1 - Executive Committee**
- Set policies on all levels
- Determine priorities on other levels
- Assure coordination on other levels
- Resolve issues that cannot be resolved on the main committee level
- Manage required resources
- Nominate and select the Chair and Vice Chair

**Level 2 - Main Committee**
- Assures coordination of Task Groups
- Agreement of Task Group documents

**Level 3 - Task Groups**
- Preparation of draft standards
- Recommend standards for materials and procedures

5. ADMINISTRATION/PROCEDURES

The main committee and task groups will work within the SAE consensus processes and the CACRC was established as a full committee within the SAE Aerospace Materials Division. SAE will provide administrative (announcements, minutes, agendas, meeting logistics) and legal support for the CACRC. Membership in SAE is not required for participation. If the meetings are hosted, there is no registration fee associated with AMS committee meetings. As a means of funding the program, SAE solicits for voluntary contributions to become an SAE corporate investor. SAE policies that govern standards development include the following:
- SAE Technical Standards Governance Policy
- SAE Aerospace Council Organization and Operating Procedures
- SAE Aerospace Materials Division Organization and Operating Guide
- SAE Standards Development Style Manual

6. COMPOSITION AND MEMBERSHIP

**Level 1 - Executive Committee:**
The Executive Committee shall be composed of the CACRC Chair, the CACRC Vice Chair, 6 representatives from OEMs, 6 representatives from airline operators or repair stations, and 2 representatives from regulatory agencies. In addition, SAE staff, task group chairs, liaisons, and the secretary will participate in the Executive Committee without a formal vote. The Executive Committee shall solicit new Executive Committee members and add them to the Executive Committee with a minimum 75% approval from the current committee members.

**Level 2 - Main Committee (CACRC)**
The CACRC Main Committee is composed of the members of the Executive Committee, Task Groups, and others interested individuals. In accordance with SAE AMS Operating Guide, members
fall into the following categories for voting purposes: User Voting Members, Producer Voting Members, Supplier Members, Consultants, Liaisons, and Mailing List. Only Voting Members have official voting privileges. Voting Members can lose their voting privileges due to lack of voting participation, such as failing to respond to 2 or more ballots.

Level 3 - Task Groups
Task Groups are composed typically of 3 or more people working on a specific area. The Task Group Chair determines task group membership. Depending on the work at hand, a Task Group Chair may expand the Task Group roster to include broader input.

7. MEETING SCHEDULE

The Executive Committee will meet on an ad-hoc basis, to coincide with CACRC meetings. The CACRC will meet twice a year (or as the Executive Committee deems necessary), alternating between locations in Europe and North America (or elsewhere as the Executive Committee deems necessary). The Task Groups will meet both independently and in conjunction with the CACRC Main Meeting, as determined by the Task Group Chair.

8. CHAIR AND VICE-CHAIR

Chair of the CACRC also serves as Chair of the Executive Committee. Chair and Vice Chair of the CACRC serve for two-year terms, serving no more than three consecutive terms. The Chair will be an airline/regulatory agency/MRO/OEM. The Chair or Vice Chair may be a retired individual from an airline/regulatory agency/MRO/OEM at the discretion of the executive committee. The members of the Executive Committee will nominate candidates for the Vice Chair position and elect the Vice Chair. The Vice Chair of the CACRC will succeed the Chair upon completion of their term(s). The Chair is responsible for presiding over meetings, maintaining Executive Committee membership, coordinating and preparing agendas as needed, promoting the CACRC, and interactions with the SAE, A4A, IATA and other organizations as needed (unless delegating duties to others). The Chair should also keep updated documents about the committee, such as a roster of the Executive Committee members, progress reports, available documents, brochures, etc.

9. SECRETARY

The Secretary can be any member of the CACRC. The Secretary is responsible for recording minutes and gathering presentations from Main Meetings and attending Executive Committee Meetings.

10. TASK GROUPS AND THEIR SCOPE OF WORK

The initial establishment of the Task Groups was created based on A4A and IATA surveys to their airline members. The Task Groups and their initial project assignment were:
Repair Materials Task Group: Standardize matrix resins, fibers, prepregs, adhesives, and associated processes such as curing, drying, impregnating, surface preparation, material testing.

Processes/Techniques Task Group: Standardize techniques like scarfing, lay-up sequences, damage removal, and bagging.

Inspection Task Group: Standardize inspection methods and techniques like damage assessment (size and type), pre- & post-repair inspection.

Design Task Group: Actual damage size related to allowable and repair damage limits, accessibility, location and type of damage, susceptibility to FOD/lightning, available repair types, and interchangeability.

Facilities Task Group: Recommendation for environmental conditions of composite/bonding shop.

Training/Glossary Task Group: Curriculum for airline composite repair specialists, airline repair design engineers, aircraft mechanics, and inspectors.

Analytical Repair Techniques Task Group: Publish a standardized technique for analyzing repairs.

Procedures Task Group: Develop standards which incorporate industry best practices to enhance repair reliability, safety and airworthiness; through the implementation and coordination of CACRC AIR, ARP, AMS, and other documents.

The Modifications Task Group was formed in 2021 at the request of the FAA.

Modifications Task Group: Develop standards which incorporate industry best practices to promote standardization of the design, analysis, and inspection of modifications to composite structure and enhance safety, airworthiness, and compliance to regulations; through the implementation and coordination of CACRC AIR, ARP, AMS, and other documents.

For a more complete description of the Task Groups, see the SAE website. As task groups finish their assignments they may become inactive, until new assignments are deemed necessary by the Executive Committee, or to perform the periodic document review and revisions as required by the SAE.

NEW TASK GROUPS AND TASKS: A new task group can be formed when the committee recognizes the need. A white paper must be written which describes the issue, a charter, specific objectives, scope, and potential deliverables. The new task group white paper must be voted on by the Executive Committee, with at least 75% voting, and at least at 75% approval of votes cast. A4A and IATA Engineering and Maintenance Committees will be informed and the proposal is considered accepted unless there is no formal refusal within 60 days. Existing Task Group can add tasks that fall within the existing charter, with the majority approval of the Executive Committee.
11. REVISION PROCEDURE:
Changes to the bylaws must first be approved unanimously by the Executive Committee voting members, and then voted on by the voting members of the CACRC main committee with at least 50% of members voting and greater than 75% approval. After the CACRC has approved a revision, it is submitted to the A4A and the IATA for acceptance. If there is a change to the CACRC committee scope, the revision must also be approved by the SAE Aerospace Council after being approved by the committee.

Changes to appendices do not require voting since they are informational only.

----------------------------------------------------------------------------------------------------------------------

APPENDIX 1 – ACHIEVEMENTS
- Published documents are shown and available on the SAE website www.sae.org
- Industry input to FAA regulatory changes, such as AC145-6 "Repair Stations for Composite and Bonded Aircraft Structure", and training initiatives.
- Industry input, guidance, and participation to research initiatives.
REVISION 1: SUMMARY OF CHANGES:
   Eliminated many references to ATA/IATA/SAE.
   Added paragraph numbers
   Para. 4 – changed “Vice Chairman” to “Chair and Vice Chair”
   Para. - Task Group additions and revisions
   Para. 5 – changed SAE Technical Standards Board Rules and Regulations (TSBOO1) to
   SAE Technical Standards Governance Policy
   Changed into 2 sentences regarding membership and meeting fees, replacing:
   “Membership in SAE is not required for participation and there is no registration fee
   associated with AMS committee meetings, because meetings are hosted.”
   Changed to the SAE Cooperative Engineering Program (CEP) to “become an SAE
   corporate investor”
   Para. 6 - “European airlines members” change to “non-North American
   airline/agency/MRO,” and “US airlines members” change to “North American
   airline/agency/MRO.”
   Level 1 - changed “6 representatives from airline operators” to “6 representatives from
   airline operators or repair stations (3 from North America and 3 from the rest of the world)”
   Changed JAA to European Aviation Safety Agency (EASA)
   Added to Para 6: “The Chair shall solicit new Executive committee members, who
   shall be agreed upon by at least 75% of the Executive committee.”
   Added to Level 2 “Only Members are allowed to vote”, and how to lose member
   status. Added voting criteria for new members
   Added to Level 3: Task Groups – changed to “3 or more people”
   Para. 7 – Meeting Schedule – added clause after the frequency of meetings “(or as the
   Executive Committee deems necessary)”, and added after the location “(or elsewhere as the
   Executive Committee deems necessary)”.  
   Para 8 – Added Chair responsibilities/duties
   Changed restriction on who is allowed to be Chair and Vice Chair by adding
   “MRO.”
   Translated “ATA and IATA” to “North American and non-North American”
   - Added “The Chair shall solicit new Executive committee members, who shall be
   agreed upon by the rest of the Executive committee.”
   Para. 9 TASK GROUPS
   Added paragraph about new task groups formation.
   Listed Analytical Repair Techniques Task Group and Procedures Assurance Task
   Group.
   Para. 10 - Added paragraph on revision procedure. Added “Changes to appendices do not
   require voting.”
   Added “Appendix 1- Achievements,” where the “Achievements” section was moved.
   Changed “AC145.XX” to “AC145-6”
   Replace list of documents with “Published many documents, that are available on the
   SAE website www.sae.org.”
   Added to the “Achievements” list
   Added “Appendix 2 – New Task Groups”

REVISION 2: SUMMARY OF CHANGES:
   Changed charter from “maintenance, inspection and repair cost” to “aircraft ownership cost”
Para 6: Deleted geographical restrictions “(3 from North America and 3 from the rest of the world)” and added “2 representatives from airworthiness authorities (Federal Aviation Authority (FAA) and European Aviation Safety Agency (EASA)” as full members of Exec. Committee.

REVISION 3: SUMMARY OF CHANGES:
- Modified Problem definition and Charter statement
- Added regulatory agencies to Executive Committee
- Broaden who is allowed to be chair and vice-chair
- Added Analytical Repair Techniques Task Group and Procedures Task group and their projects.

REVISION 4: SUMMARY OF CHANGES:
- Added modifications to Sections 1, 2, 3, and 10.