



AEROSPACE INFORMATION REPORT

AIR6825™

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Identification and Assessment of Damage to Composite Aircraft Structures Training Document

RATIONALE

With the increased use of composites in the construction of primary structure in commercial aircraft particularly of structure exposed to accidental damage during operation, there is a growing concern that damage may be improperly identified, inadequately assessed, or not reported.

A risk exists due to:

1. Many of the individuals working around composite aircraft may have little or no specific training or familiarity with composites and their differences from metals. This creates an opportunity for a common human factor "Lack of Knowledge" to affect their decisions and actions when reporting or investigating an aircraft damage event.
2. Experience with previous aircraft may lead to human factors "Complacency" and "Norms" which may prevent individuals from taking the actions necessary to properly address composite structure.
3. Individuals lacking proper training may not have the assertiveness to assess and report damage while operating under the stress, pressure, and fatigue common in the airline industry.
4. Incomplete reporting of composite damage leads to more iterations and time in damage assessment process.

All personnel working in the vicinity of a composite aircraft must be made aware of the importance of reporting all potential damage events to composite structure. Once the event is reported, it is the responsibility of the targeted audience to begin the assessment process, which will be covered in this curriculum.

The use of composites in commercial aircraft requires proper training for identification, assessment, and reporting of accidental damage during operations.

The damage assessment process on composite structure may require the use of special inspection tools defined as NDI equipment specified by the appropriate technical manual intended for use by non-NDT personnel. Training to operate these tools, the understanding of the composite structure configuration (e.g., surface, substructure, taper regions), and routine exposure to usage of the tools are key factors for effective damage assessment. The targeted audience includes line maintenance technicians, inspectors, certifying staff that can release the aircraft, and personnel evaluating the damage against Allowable Damage Limits (ADLs).

AIR6825 has been reaffirmed to comply with the SAE Five-Year Review policy.

A reaffirmed status is given to technical reports that have been reviewed by the technical committee and deemed to be current with no need for immediate revision. No changes have been made to this document as a result of this review.

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1. SCOPE

Individuals who complete the applicable modules aligned with this training document will be able to define the type of damage, define the extent of damage, determine if further inspection is required, evaluate the damage against published allowable damage limits, and provide accurate documentation of the damage. The intended outcome of the training is increased safety such that no aircraft is released with unknown damage and that the aircraft meets continued airworthiness requirements. The goal is to change the culture from damage discovery to damage reporting while also reducing or eliminating flight delays due to incorrect or insufficient information.

Teaching levels have been assigned to the curriculum to define the knowledge, skills, and abilities graduates will need. Minimum hours of instruction have been provided to ensure adequate coverage of all subject matter including lecture and practical exercise. These minimums may be exceeded and may include an increase in the total number of training hours and/or increases in the teaching levels. The modules are intended to be a competency-based training approach.

Each curriculum is a subpart of this document.

Module 1 is the Composite Awareness curriculum, independent of the application.

Module 2 is the Initial Inspection and Damage Mapping curriculum.

Module 3 is the Special Inspection Tools curriculum.

Module 4 is the Reporting, Recording, and Assessment curriculum.

NOTE: While the modules in this document are technically interrelated, each module can be trained independently; modules may be selected as applicable to an operator's or maintenance organization's needs. The combination of the modules represents the applicable identification and assessment process for damage to composite aircraft structures (see Figure 1). Module 1 is prerequisite for attendance to the other modules.

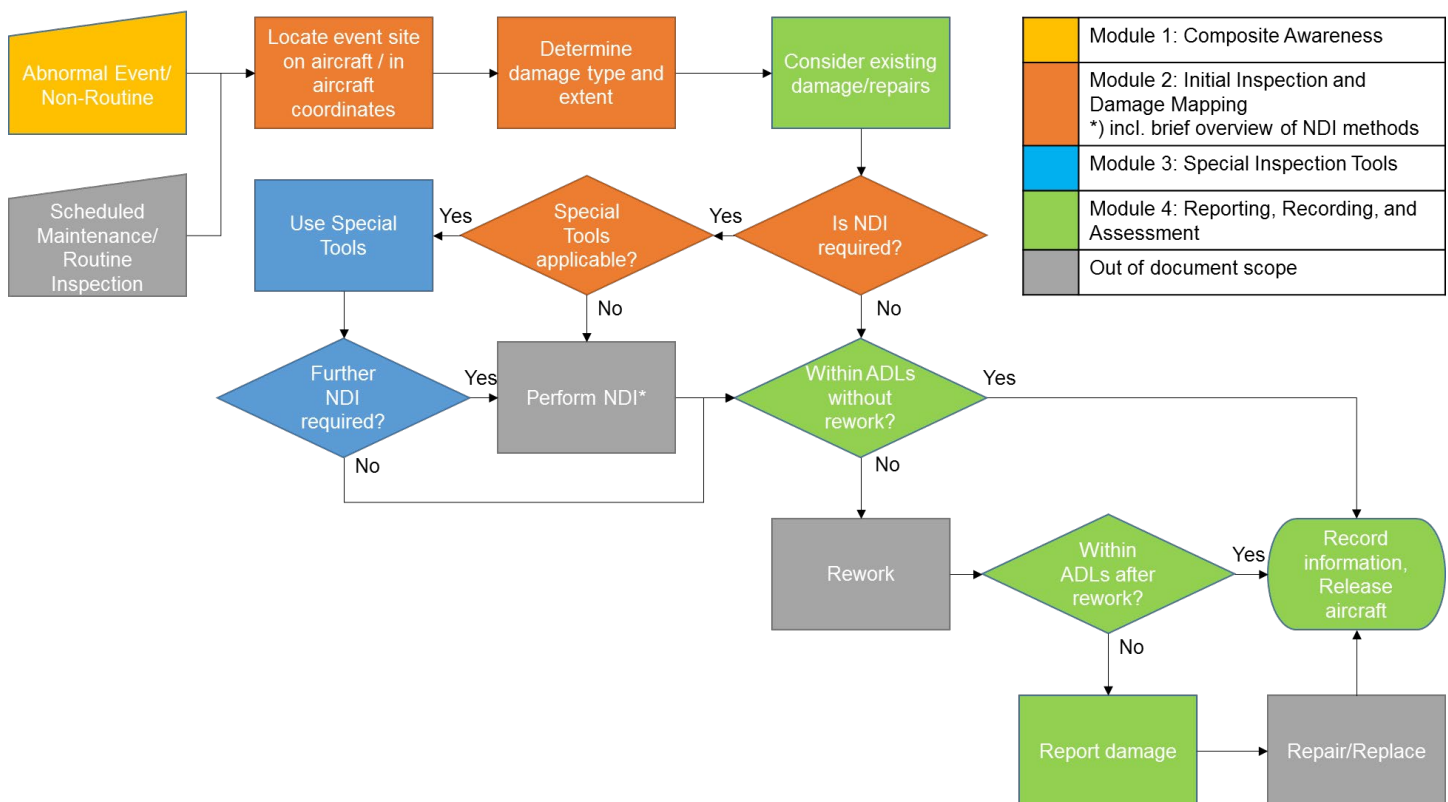


Figure 1 - Damage assessment process flowchart and representation in modules

The contents of Module 1 may also be used for composite awareness training of a broader target audience, including line mechanics.

2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AIR4844 Composites and Metal Bonding Glossary

AIR5719 Teaching Points for a Class on "Critical Issues in Composite Maintenance, Repair and Overhaul"

ARP5089 Composite Repair NDT/NDI Handbook

2.2 FAA and EASA Publications

Available from Federal Aviation Administration, 800 Independence Avenue, SW, Washington, DC 20591, Tel: 866-835-5322, www.faa.gov and from European Aviation Safety Agency, Konrad-Adenauer-Ufer 3, D-50668 Cologne, Germany (for visitors and for mail over 1 kg) and Postfach 10 12 53, D-50452 Cologne, Germany (for mail 1 kg or less); Tel: +49 221 8999 000, www.easa.europa.eu.

Title 14 Code of Federal Regulations, Part 65 Certification: Airmen Other Than Flight Crewmembers

EASA Part-66

EASA AMC 20-29 Composite Aircraft Structure

EASA CM-MCSD-001 Issue 01 Development of OSD for Maintenance Certifying Staff

EASA Part-145, 145.A.30

Title 14 Code of Federal Regulations, Part 145 Subpart D – Personnel

FAA AC 145-10 Repair Station Training Program

FAA AC 20-107B Composite Aircraft Structure

FAA AC 65-33 Development of Training/Qualification Programs for Composite Maintenance Technicians

FAA AC 43-214 Repairs and Alterations to Composite and Bonded Aircraft Structure

2.3 Industry References

Applicable OEM Manuals and Guidance Material

D.P. Roach, T.M. Rice; Sandia National Laboratory Report DOT/FAA/TC-15/4: A Quantitative Assessment of Advanced NDI Techniques for Detecting Flaws in Composite Laminate Aircraft Structures; 2016, Albuquerque)

3. STUDENT PREREQUISITES

Students who take this course should be experienced in aircraft maintenance and familiar with the applicable maintenance data.