Structural Repair Manual

Training

ACRATS

DETAILED COURSE OUTLINE ATS2211

UNDERSTANDING AND INTERPRETING THE STRUCTURAL REPAIR MANUAL (SRM), INSPECTION, DAMAGE RECOGNITION AND ASSESSMENT

Course Title
Understanding and Interpreting the Structural Repair Manual (SRM), Inspection, Damage Recognition and Assessment

Course Tag
SRM Training

Course ID
ATS2211

Course Duration
3 Working Days

Prerequisites
Prior training or experience is not required

Learning Hours
Classroom: 6,5 Hours
Practical 14,5 Hours

Highest Standards
Meets OEM SRM Standards

Scope and Purpose

This Practical SRM Training Program has been developed to meet the knowledge and skill requirements of an aircraft technician who needs to understand and interpret the Structural Repair Manual (SRM) and perform inspections on aircraft or aircraft components. This course aims to equip participants with the necessary expertise to effectively assess, repair, and maintain various types of aircraft structures, ensuring their airworthiness and safety. Participants will gain basic skills and confidence in using the SRM to perform damage assessment, select repair procedures, and understand repair methods within the limits of the SRM, Component Maintenance Manual, and Aircraft Maintenance Manual. The course includes assessment, inspection, and repair case studies that require participants to determine part identification, allowable damage limits, and detailed repair options for both metallic and composite structures.

Course Module Overview

- Introduction/About the Structural Repair Manual
- Navigating the Structural Repair Manual
- Key Definitions in Aircraft Structural Repair and the Structural Repair Manual
- Inspection and Damage Assessment (Theoretical- and Practical Cases)
- Damage Reporting
- Case Studies

Learning Goals

Upon successful completion of this training, the student will be able to:

- Understand aircraft structural design principles and the role of structural components;
- Gain proficiency in identifying and assessing different types of structural damage and defects;
- Identify specific airplane parts and locations;
- Find allowable damage limits in the SRM;
- Identify the types of damage that can be repaired using the SRM;
- Identify the differences between repair types;
- Design repairs for specific damage;
- Conduct accurate damage assessments and report findings clearly and accurately as required by the OEM;
- Indicate the exact location of damage on the aircraft;
- Divide and assess multiple damages (e.g., a lightning strike involving multiple panels);
- Create clear and accurate damage reports;
- Handle paperwork properly and efficiently;
- Determine if damage is repairable using the SRM;
- Identify metal skin and composite repair processes;
- Identify composite ply materials, sequences, and orientations for various composite structures;
- Enhance skills in documentation and reporting of repairs and maintenance activities.

Detailed Module Overview

	Topic	Teaching Level	Classroom Hours	Practical Hours
1	Introduction/About the Structural Repair Manual	1	2	
2	Navigating the Structural Repair Manual	1	2	
3	Key Definitions in Aircraft Structural Repair and the Structural Repair Manual	1	2	
4	Inspection and Damage Assessment (Theoretical- and Practical Cases)	2	2	
5	Damage Reporting	3	2	2
6	Case Studies	3	6	6
	Total Hours	-	16	8
	Course Length		24 Hours	

Teaching Level 1
Teaching level 1 includes the transferring of knowledge from the instructor to the student, through instruction, lecture, demonstration and by having topic-related discussions. Knowledge transfer can take place in a classroom (physical training) as well as through online learning (Computer Based Training (CBT)). The content of e-learning modules should be structured in such a way, keeping in mind that discussions are not possible (it is classified as passive learning), and the participant should be able to understand the material without the intervention of an instructor. Online classes or e-learning modules should be arranged in such a way that the participant has the opportunity to ask questions to the designated instructor or to provide (general) comments. Teaching level A does not include a practical application (hands-on) or the development of practical skills.

Teaching Level 2
Teaching level 2 includes the transferring of knowledge from the instructor to the student, through instruction, lecture, demonstration, topic-related discussions, and limited practical application, but does not include the development of sufficient manipulative skill to perform basic operations. Knowledge transfer can take place in a classroom (physical training) as well as through online learning (Computer Based Training (CBT)). The content of e-learning modules should be structured in such a way, keeping in mind that discussions are not possible (it being classified as passive learning), that the participant should be able to understand the material without the intervention of an instructor. Online classes or e-learning modules should be arranged in such a way that the participant has the opportunity to ask questions to the designated instructor, o to provide (general) comments. Online classes or e-learning modules must contain sufficient demonstration by means of explanatory videos. A high degree of interaction must be built in. Teaching level B requires some hands-on manipulative skills, or practical demonstration of the skills and their accompanying actual or simulated components/equipment, but still may be taught primarily in the classroom environment.

Teaching Level 3
Teaching level 3 includes the transferring of knowledge from the instructor to the student, through instruction, lecture, demonstration, having topic related discussions and a high degree of practical application to develop sufficient manipulative skill to accomplish return to service (normal operation). Teaching level C requires hands-on skill, as well as sufficient and appropriate instructional aides to train the participants to develop manipulative skills sufficient to simulate return to service mechanical skill. At this level, the teaching aids must be similar to or be the actual items of equipment on which the participant is expected to develop the required skill levels. A teaching level C subject cannot be taught solely by instruction or lecture in the classroom; the appropriate training aids and hands-on experience must be used. E-learning modules can be used as a guide through practical assignments. Teaching level C includes a high degree of practical application (hands-on) and a strong focus on the development of practical skills.

Module 1 - Introduction/About the Structural Repair Manual

In Module 1, you'll gain a comprehensive understanding of aircraft technical manuals, focusing specifically on the Structural Repair Manual (SRM). This module covers the breakdown and contents of the SRM, including its purpose and how it is organized. You will learn about the different sections within the SRM, such as the Frontmatter and Chapter 51, which are crucial for understanding the structure and repair processes of aircraft. Additionally, you will explore Chapters 52 through 57, gaining insights into their specific purposes and contents.

Learning Goals

Upon successful completion of this module, the student will be able to:

- Describe the three groups in which aircraft technical manuals can be divided;
- Describe the purpose and contents of the SRM;
- Describe the purpose and contents of the Frontmatter;
- Describe the purpose and contents of Chapter 51 within the SRM;
- Describe the primary aircraft structure chapters within the SRM.

Topics

1. Introduction
2. Introduction to Maintenance Documentation
3. Introduction to the Structural Repair Manual
4. About the Structural Repair Manual
5. Breakdown of the Structural Repair Manual
6. Contents of the Structural Repair Manual
7. Frontmatter
    a. Purpose
    b. Breakdown
    c. Content
8. Chapter 51
    a. Purpose
    b. Breakdown
    c. Content
9. Chapter 52 Thru 57
    a. Purpose
    b. Breakdown
    c. Content

Module 2 - Navigating the Structural Repair Manual

In Module 2, you'll delve into the numbering systems used in aircraft technical data, from ATA 100 and A4A iSpec 2200 to S1000D. This module will provide you with a clear understanding of how these numbering systems are organized and how they facilitate the management and retrieval of technical information. You will learn about the three elements system within the SRM, including identification, allowable damage limits, and repair procedures. Additionally, you will learn about the use of different page blocks within SRM chapters, enhancing your ability to navigate and interpret the manual effectively.

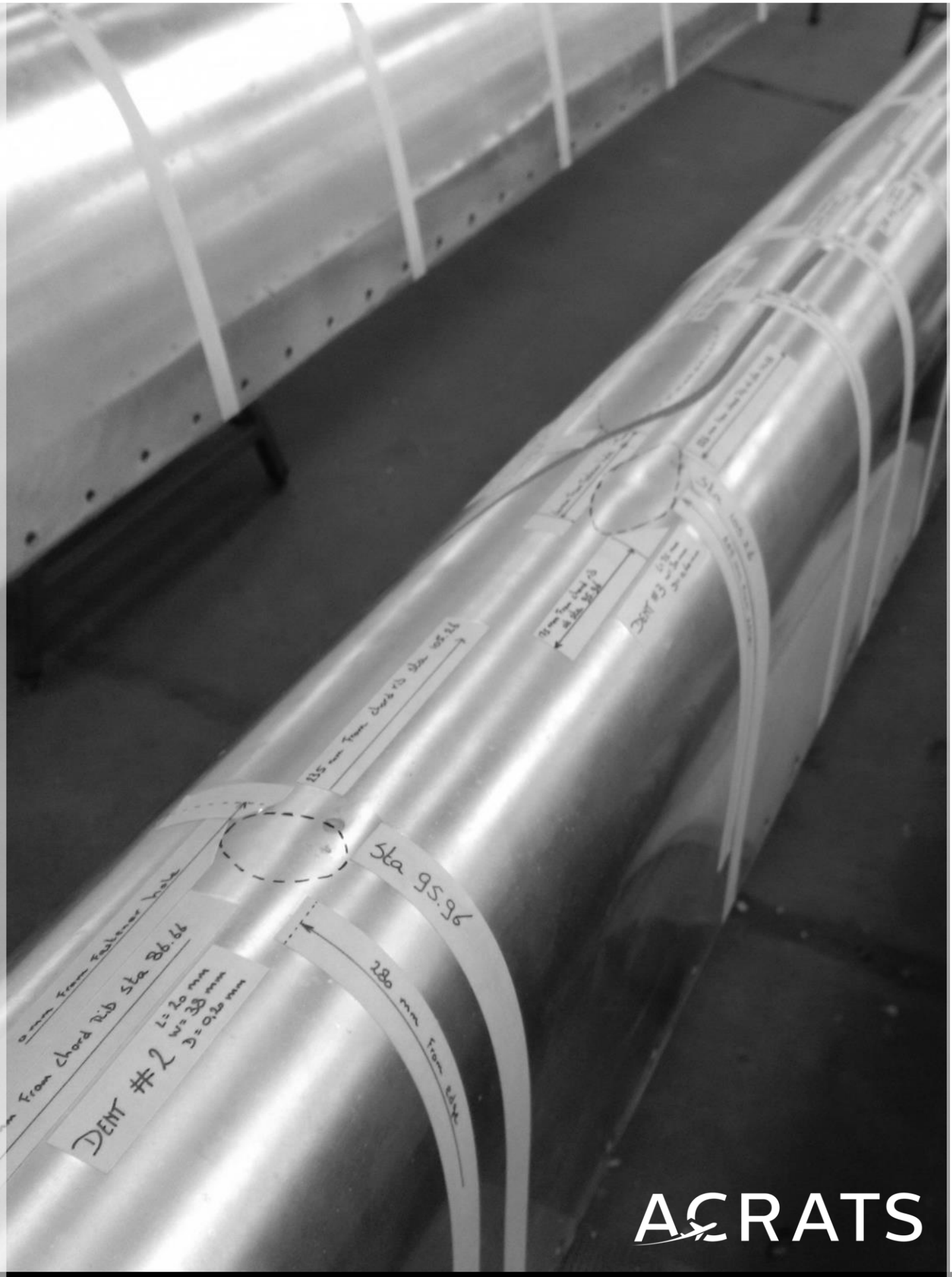
Learning Goals

Upon successful completion of this module, the student will be able to:

- Explain the numbering system used in aircraft technical data;
- Explain the chapter numbering system accordance ATA100, A41 iSpec 2200 and S1000D;
- Describe the three elements system within the SRM;
- Describe the use of different page blocks within the SRM chapter.

Topics

a. Introduction
b. Chapter Numbering System
    a. ATA 100
    b. A4A iSpec 2200
    c. S1000D
c. Segments of SRM Chapters
    a. Identification
    b. Allowable Damage Limits
    c. Repair
d. Pageblocks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Module 3 - Key Definitions in Aircraft Structural Repair and the Structural Repair Manual

In Module 3, you'll gain a deep understanding of essential definitions and concepts related to aircraft structural repair used in the structural repair manual. This module will clarify the differences and significance of primary and secondary structures, as well as the meaning of Fatigue Critical Baseline Structure (FCBS). You will learn about the three possible outcomes of damage assessments—allowable damage, repairable damage, and replacement—and the distinctions between various repair categories. Additionally, you will understand the importance of flight cycles and hours in the context of aircraft maintenance and repair.

Learning Goals

Upon successful completion of this module, the student will be able to:

- Describe the difference and meaning of primary and secondary structure;
- Describe the meaning of Fatigue Critical Baseline Structure (FCBS);
- Describe the three possible outcomes of damage assessments (allowable damage, repairable damage, and part replacement);
- Describe the difference in repair categories;
- Describe the meaning of flight cycles and hours.

Topics

1. Introduction
2. Primary Structure
3. Secondary Structure
4. Fatigue Critical Baseline Structure (FCBS)
5. Damage Classification
6. Allowable Damage
7. Repairable Damage
8. Part Replacement
9. Repair Categories
10. Flight Cycles & Flight hours

Module 4 - Inspection and Damage Assessment (Theoretical- and Practical Cases)

In Module 4, you'll learn the critical steps involved in assessing damage on the aircraft structure and components. This module will guide you through the process of finding the correct effectivity for the aircraft, including understanding cumulative line numbers, weight variants, manufacturer serial numbers, modifications, and service bulletins. You will learn how to accurately identify the damaged part and its location, as well as how to identify the nature and extent of the damage. Additionally, you will learn how to find the allowable damage limits and select the appropriate repair procedure. Furthermore, you will learn to check the correct effectivity of chapters and demonstrate the correct use of inspection tooling for both metallic and composite structures. This module ensures that you can perform thorough and accurate damage assessments, ensuring the safety and integrity of the aircraft.

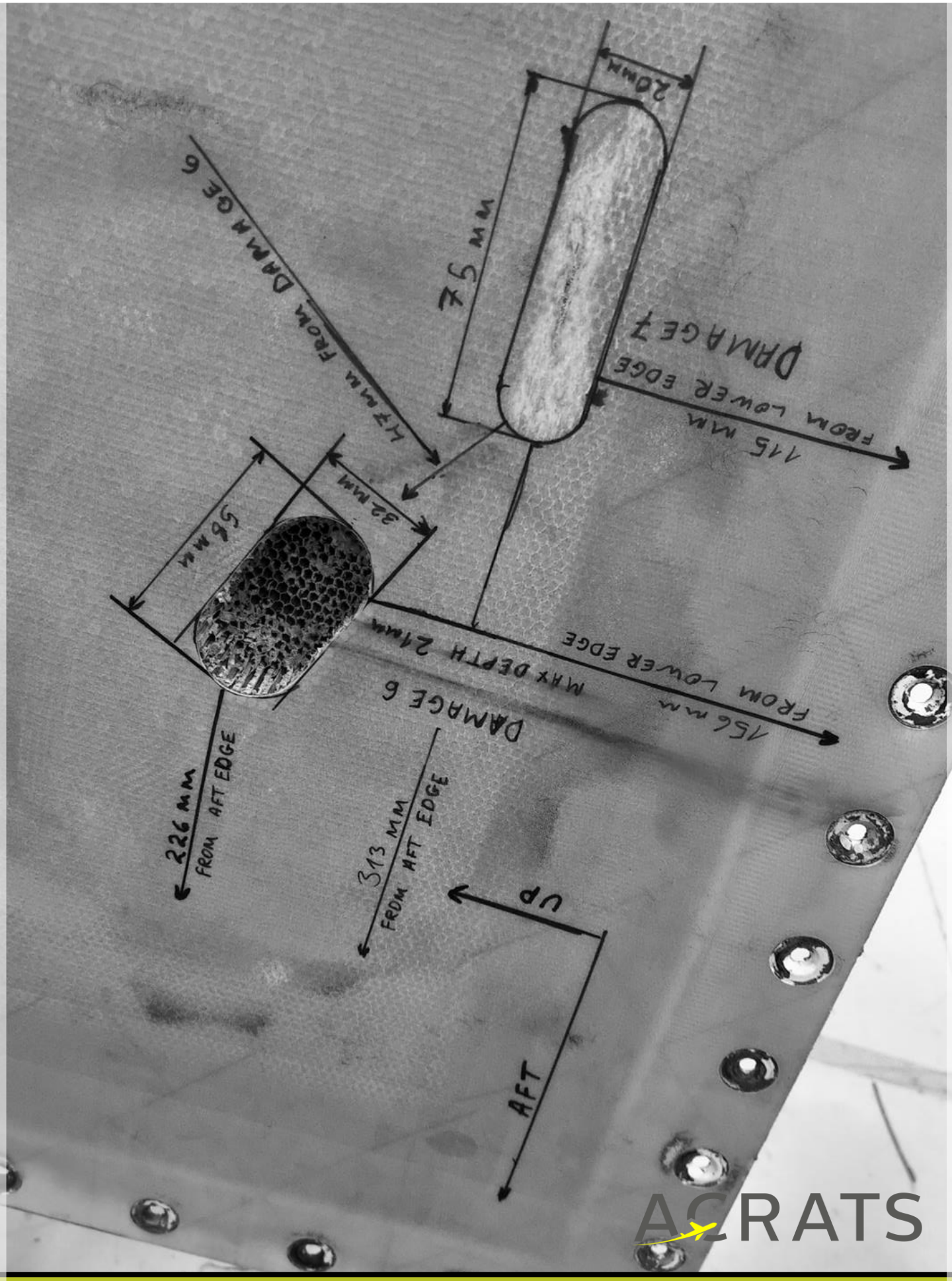
Learning Goals

Upon successful completion of this module, the student will be able to:

- Check if effectivity is applicable and know how to find the applicable effectivity for the aircraft, including cumulative line numbers, weight variants, manufacturer serial numbers, modifications, and service bulletins;
- Demonstrate the correct use of inspection tooling to be used on metallic structures;
- Demonstrate the correct use of inspection tooling to be used on composite structures;
- Identify the damaged part and location;
- Determine the exact location of a damage;
- Identify the type and dimensions of the damage;
- Perform the procedure of damage mapping;
- Find the allowable damage limits;
- Explain when the damage needs to be rework prior to assessment
- Select the applicable repair procedure (corrective action).

Topics

1. Introduction
2. Human Factors
3. Check Effectivity
    a. Cumulative Line Numbers
    b. Weight Variant
    c. Manufacturer Serial Number
    d. Modifications
    e. Service Bulletins
4. Identification of the Damaged Part & Location
    a. Nomenclatures
    b. General (LH, RH, FWD, AFT, DOF, etc.)
    c. Stringers
    d. Stations
    e. Frames
    f. Zones
5. Inspection Tooling
    a. Tooling for Metallic Structures
    b. Tooling for Composite Structure (Including the Automated Tap-Tester (Woodpecker)
6. Identification of the Damage
    a. Types of Damage (Damage Classification)
        i. Damage on Metallic Structure (including corrosion)
        ii. Damage on Composite Structure
    b. Dimensions of the Damage
        i. Measuring Tooling
        ii. Damage Mapping
7. Damage Rework
    a. Applicability
    b. Restriction
8. Find the Allowable Damage Limits
9. Find the Applicable Repair Procedure


20MM
94 MM
DAMAGE 7
FROM LOWER EDGE
415 MM
147MM FROM DAMAGE 6
32MM
55MM
MAX DEPTH 21MM
FROM LOWER EDGE
456 MM
DAMAGE 6
226 MM
FROM AFT EDGE
313 MM
FROM AFT EDGE
UP
AFT

Module 5 - Damage Reporting

In Module 5, you will learn the essential aspects of damage reporting in the process of damage assessment. This module covers how to accurately describe damage, identify and report the exact location, and the importance of uniformity in reporting. You will also learn the correct methods for making and adding photos or sketches to a damage report, and the procedures for reporting to your engineering department or OEM. Additionally, you will understand the importance of regulatory compliance and traceability in aviation and therefore in damage reporting.

Learning Goals

Upon successful completion of this module, the student will be able to:

- Form an accurate and correct finding description;
- Describe the steps to narrow down the exact damage location;
- Describe the reason why uniformity in reporting is important;
- Describe the correct method of making and adding photo(s) and/or sketches to a damage report;
- Describe the correct way of reporting to your own engineering department and/or OEM;
- Explain the importance of regulatory compliance and standards in damage reporting;
- Ensure traceability in damage reports for future reference and audits.

Topics

1. Introduction
2. Documentation and Damage Reporting
3. Essential Information/Minimal Requirements
4. Damage Location Determination
5. Adding Visual Evidence to Reports
6. Reporting Protocols
7. Regulatory Compliance and Standards
8. Traceability
9. Practical Examples

6 - Case Studies

- ✓ Identify specific airplane parts and locations
- ✓ Find allowable damage limits in the structural repair manual (SRM).
- ✓ Identify types of damage that can be repaired using the SRM.
- ✓ Identify the differences between repair types.
- ✓ Nose Cowl Skin Damage
- ✓ Door Skin Damage and Operating Limits
- ✓ Nacelle Structure Damage
- ✓ Composite Structure Damage
- ✓ Fuselage Interior Structure Damage
- ✓ Fuselage and Door Exterior Structure Damage
- ✓ Identify the composite ply materials, sequences and orientations for composite strucucture

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