Textron Aviation Team Structures

Structural Damage Reporting / Team Services
Overview

• Our Services
• Repair Process
• Required Information / Damage Data
  • Structural Damage Report (SDR)
    • View SDR: https://support.cessna.com/custconf/pageview?as_id=31065
  • Non-Destructive Inspection (NDI / NDT)
  • Photographs
  • Damage Mapping
• How to Reach Us
Note on the SDR what service(s) you are in pursuit of:

- **General Structures Guidance**
  - Drawing and parts research
  - All models / Jet & Prop

- **Repair Definition**
  - FAA Form 8100-9 Major Repairs

- **Minor Repair**
  - Structural issues not requiring an 8100-9 Major Repair
  - Team Structures developed letter

- **Flight Extension**
  - Operate aircraft with a known structural condition for a limited amount of days/hours
  - Team Structures developed letter

- **Ferry Flight**
  - Relocate a damaged aircraft to a suitable repair facility
  - Team Structures developed letter

- **No Technical Objection Letter**
  - Misc. structural deviation requests

- **Onsite Damage Evaluation**
  - Evaluate highly damaged aircraft in the field
  - Team Structures developed report

- **Data Plate Replacement**
  - For data plates that have gone missing or become illegible

**NOTE:** Team Structures **does not provide mod or STC approvals. Contact your local TXTAV Service Center for assistance.**
Repair Definition Process (FAA Form 8100-9)

1. **Structural damage discovered**

2. **Contact Team Structures**
   - Provide damage data (pics, dimensions, NDT, mapping, SDR)

3. **CSE determines quote and ECD for RD and advises repair facility**

4. **Adjustments to ECD provided to repair facility if needed after full engineering review**

5. **Quote is approved by repair facility and engineer is assigned to repair and commits to ECD**

6. **Preliminary RD issued and repair facility begins work**

7. **CSE distributes Final RD / 8100-9 to repair facility**

8. **Final RD/Finalization**
   - NO: Engineering revises PRD and adjusts ECD
   - YES: Repair is Finalized through engineering

**Definitions:**
- **NDT = Non Destructive Testing**
- **SDR = Structural Damage Report**
- **CSE = Customer Service Engineer**
- **RD = Repair Definition**
- **PRD = Preliminary Repair Definition**
- **ECD = Estimated Completion Date**
Structural Damage Report

View SDR: [https://support.cessna.com/custconf/pageview?as_id=31065](https://support.cessna.com/custconf/pageview?as_id=31065)

- Fill out all applicable fields of the SDR
- Include Part Numbers, damage dimensions, location, cause, etc.
- Get us as much information as possible from the get-go
- Lack of information and damage data is the leading cause in repair development delays
Instructional Videos – Documenting, Inspecting and Reporting Damage

- After a Bird Strike
- After a Lightning Strike
- Aircraft Symmetry Check
- Documenting Corrosion Damage at Antenna Site
- Fastener Hole Inspection
- Labeling Dented Skin
- Locating Damage
- Onsite Damage Evaluation
- Ordering Repair Sheet Material
- Oversizing Fasteners
Non-Destructive Testing/Inspection

• NDI types:
  • Ultrasonic Thickness (UT)
  • Ultrasound for bond checks
  • Eddy Current (ET) cracks/surface voids
  • ET for heat damage (conductivity)

• Reference CIL-20-01 for qualified NDT facilities
Instructional Videos – Measuring and NDT

Measuring

- Measuring a Mold Impression Using and Optical Micrometer
- Measuring Chafe or Dent Depths by Taking a Polyester Resin Mold Impression
- Measuring Chafe or Dent Depths Using a Depth Micrometer
- Measuring Chafe or Dent Depths Using a Drill Bits or Wire Gage
- Measuring Chafe or Dent Depths Using an Optical Micrometer
- Measuring Chafe or Dent Depths Using Feeler Gauges
- Measuring Dented Skin (Digital Calipers VS Depth Mic)

NDT

- Finding Cessna Certified NDT Facilities
- Heat Damage Mapping
- Obtaining Cessna NDT Certification
- UT Mapping
Ultrasonic Thickness (UT)

- Typically used after corrosion or gouge blending
- Locally blend first then contact us with data
  - DO NOT blend deeper than necessary to remove damage
  - Collect samples of oxidation in case TXTAV M&P analysis is needed
- UT results should be placed in a grid
- Grid size
  - 10 inches or more in both directions = 1 inch grids
  - 3-10 inches in both directions = ½ inch grids
  - 0-3 inches in both directions = ¼ inch grids
  - Mark FS, WS, etc. on grids
Put thickness measurements directly on gridwork or transfer to a spreadsheet. Label nearby FS, WS, FWD, RH, etc.
Heat Damage Mapping

- Obtain material properties from SRM or Team Structures
- One inch NDT grid squares
- Apply grid to discolored area, or until conductivity readings normalize in unaffected areas
- Record value in each square
Heat Damage Mapping Example
Photographs

• 3-4 Photos of each damage area
  • Overall view to gradually getting close up

• **Take Picture in High-Resolution (at least 5MP)**
• Ensure good lighting, no glare
• Ensure area is in focus
• Identify orientation (view looking forward, outboard, etc.)
• Review photos before you send them
• DO NOT fax photos or resize images before sending

*Remember, we cannot see the damage in person, photos have to show us everything.*
Instructional Videos – Taking Photos

- Camera Focusing
- Image Size
- Intermediate Photographs
- Macro Photographs
- Merging Images for Widespread Damage
- Orientation Photographs
- Picture Lighting
- Resizing Multiple Pics for Emailing
- Setting Camera Jpeg Quality
Progressive Pictures

All pictures should be shot in a similar sequence as shown. Never assume we know where you are on the aircraft or what you are looking at.
Low Resolution Picture Example
Corrosion site pixelates when zoomed in showing no detail
High Resolution Picture Example
Corrosion site now shows sharp details when zoomed in
Picture Lighting/Exposure

- Use flash only as a last resort
- Use it at an angle the won’t reflect light back into the lens
Picture Lighting/Exposure

• **Image Shake**
  • occurs when the camera is moved while capturing and causes an unusable, blurred image
  • Typical in low light where a slower shutter speed is used
  • Correct this with abundant light
• Using a drop light will provide bright, evenly distributed light for a sharp image
Use lighting to help define dents
• Take note of where the focus box is on your camera/smartphone
  – The focus box will usually adjust the exposure (lighting) as well

Camera’s focus point centered through fastener hole and onto shop floor leaving the part blurry and out of focus
Tap to focus is available on smartphones
This will adjust exposure as well
(iPhone shown)
In general, the closer you are, the shallower the depth of field is.
Damage Mapping

• Forms of mapping
  • Hand drawn sketch
  • Electronic sketch
  • Photo overlay/markup
  • Impression molds

• Use inches in decimal form
  • No metric measurements
  • No fractions

• Data points to mark
  • Size of damage: height, width, length, depth
  • Location
    • Distance to edge of part (EOP), fastener, or other adjacent structure
    • Mark station references (FS, BL, WL, SS, etc…)
Damage Map Example
Damage Mold Example

Good for tight areas where access is limited.
Tangible and can be sent to Team Structures if necessary.
Use LPS for mold release.
Damage Documentation Video

- Smartphone provides great HD Video
  - Share video to YouTube or cloud share to maintain high resolution
  - Emailing a video can reduce the video quality significantly

- Great for:
  - Conveying overall damage
  - For difficulties/obstacles on a Repair Definition (RD)
    - No long emails
    - Reduces assumptions

- Work video from overall to close up
- Mention locations, details, and any info pertinent to repair pursuit
- Keep video to 20-30 seconds to keep file size down
- Keep the area well lit
- Engineering can pull image stills from the video to use on the RD
Wide Spread Damage Mapping

Good example of labeling damage sites and providing a close up image to show UT data
Key Takeaways

• The main cause of repair delays is lack of damage data (damage location/dimensions, usable photos, etc.)
• Always follow up with a phone call if a situation needs immediate attention
• Fill out the SDR entirely and provide as much detail as possible
• Send us in focus, high resolution photos (or video) from far back and up close to damage and review the photos before sending
• Markup images showing dimensions of damage and distance to adjacent structure or EOP
• When addressing gouges or corrosion, blend damage site and report thickness remaining via NDT
  • Collect corrosion/oxidation samples in case they are needed for analysis
• Let us know on the SDR what you need (ferry flight, RD, NTO, etc.)
How to Contact Us

US Team
- In office 7AM – 5PM CST Mon-Thu | 7AM – 7PM CST Fri-Sun
- Structures Team Line: +1 316-517-6061
- Structures Team Email: Structures@txtav.com
  - Always follow up email with a phone call if issue needs immediate attention
- After Hours / Holiday On-Call Support
  - Simply dial the Structures Team Line and follow the prompts
  - 1CALL: 316-517-2090 or 1-844-226-9705

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Instructional Videos – General

- Locating Standard Repairs and Structures Videos
- Preparing Parked Aircraft for Snow and Damage Prevention
- Paint Thickness Controls on Composite Aircraft Surfaces
- Citation SRM Skin Blending Allowances
- Ferry Flight with De-Ice Boot(s) Removed
- Ferry Flight with Wingtips Removed
- Hail Damage Reporting
- RMS Surface Finish
- Toilet Spill (Blue Water) Cleaning Procedures
- Microbiological Growth in Fuel Tanks
- To Blend or Spot Remove Damage
- Surface Corrosion on Composite Lightning Strike Layer (ALS)
- Fire Retardant Foam Clean-up
- Making a Stipple Brush
- Using a Stipple Brush
- Major VS Minor Repair Criteria
- Installing Hi-Lok Fasteners Using String Trimmer Line
- Saturating Composite Cloth Using Nonbonding Film
- Cutting Composite Cloth using the “Dry” Method
- Cutting Composite Cloth using the “Wet” Method
- How to Tape Damaged Parts for a Ferry Flight
- Current Epoxy Primer Recommendations
- Evaluating Heat Damage on Aluminum Using a Scotch-Brite pad
- Using a “Paint Cutter” to Reduce Paint Chips during Panel Removal
- Using “Grinding Compound” or “E-Z Grip” to remove panel screws
- Sanded Rivets
- Return To Service Considerations After Water Submersion
Instructional Videos – Aircraft Specific Repairs

Prop
- 182 Cracked Fwd Door Post Jamb Repair
- Cessna Single Engine Tie-Down and Mooring Load Limits
- Lwr Firewall Fasteners Model 172R & 172S
- Model 182 & 206 Wing Leading Edge Skin Replacement
- Model 182S, 182T & T182T Firewall Fasteners
- Model 208 Caravan Wing Removal
- Model 208 Shoring with a TKS Blister Pod
- Shoring the Cessna Caravan
- Shoring The Cessna Caravan when equipped with floats
- Single Engine Recip Aircraft Bent Main Landing Gear Spring
- Single Engine Recip Aircraft Main Landing Gear Spring Damage (Part 1)
- Single Engine Recip Aircraft Main Landing Gear Spring Damage (Part 2)
- Single Engine Recip Flap Track Wear
- Single Engine Wing Replacement Basic Considerations
- Tow Hitch Installation on Cessna Single Engine Aircraft

Jet
- 750 Wing Skin General Shot Peening
- Axle Corrosion Blending on Models 510, 525, 525A, 525B, 525C, XL and XLS
- Axle Corrosion Blending on Models 680 and 750
- Citation S550 and 560 Stub Wing Fastener
- Citation X Winglet Damage Assistance
- Emergency Lifting and Slinging the Citation 560XL
- Emergency Lifting and Slinging the Citation X
- Emergency Lifting and Slinging the CJ Series Aircraft
- Large Cabin (560XL, 650, 680 & 750) Windshield Frame Nutplate Replacement
- MCD Step Bearing Replacement (500 series)
- Model 500 & 525 Series NLG Uplock Zee Channel Fasteners
- Model 500 Series Phase 14 Main Spar Carrythru Inspection
- Model 500 Series Stubwing Heated Leading Edge Nutplate Replacement
- Model 525, 525A, 525B Stall Strips
- Model 550 Wing Inbd Upr LE Skin Assy Replacement Options
- Model 560 Phase 66 Requirements
- Model 560 Stall Strips
- Obtaining the Model 560 (Citation V) Cessna 400lb GWI STC

Other
- Applying for a Textron Aviation Credit Account