Use of FAA Designated Engineering Representatives (DER) for Major Repairs and Alterations (MRA) Under 14 CFR Part 43

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Purpose

- *The purpose of this presentation is to communicate how a DER can help you with major alteration and repair data*
- Disclaimer: any opinions or considerations in this presentation are those of the author, and do not represent any official FAA position - every project is different - consult with your local FAA representative where interpretation might be required

What we will cover:

1. MRA vs Field Approval, what's the difference?
2. What is Approved Data?
3. Basic steps to complete an MRA with a DER
4. Where to get good guidance on whether I can do an MRA or need some other type of approval?
5. Limitations to consider for using DER approved data
6. What about making parts? Can I do that? Can a DER help me?
7. Doing it in real life – examples
8. Questions

How is a Field Approval different than an MRA with DER approved data?

- DER MRA – you have all the approved data you need; for a field approval – you do not
- From AC43-210

"***DER data is not a field approval, but is approved data that, like other approved data, can be used in the performance of major alterations or repairs without further approval if the data addresses the entire alteration or repair. In this case, you do not need to request a field approval from the FAA***."

What is "approved data?"

- AC 43-210 and 20-177 have a comprehensive list of what constitutes approved data
- Many, many types: TCDS, STC, ADs, AMOCs, SRMs, 337s, PMA, TSOA, ODA (or DAS), SFAR 36 (now RS ODA), manufacturers' service documents, service bulletins, AC43-13 (as appropriate) … and DER approved data

The 10,000' AGL view: basic 9 steps for obtaining DER data approval for MRA

1. Major or minor: Identify that you, indeed have a "major repair or alteration" at hand per Part 43; not a "major change in type design," which would require an STC under Part 21.
2. Make sure your major alteration or repair is eligible for DER approval: Use the Order 8300.16 job aid. No Airworthiness Limitations changes, life limits, ADs, special conditions, AFMS revisions or other items whose approval is reserved for the FAA

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3. Determine applicable airworthiness requirements: Identify the appropriate Subparts of the aircraft's certification basis that might be affected by the MRA. i.e. Structures, Powerplant, Electrical Systems, etc…
4. Find a consultant DER for each area of expertise: DER directory, past personal experience, good recommendation, etc

The 10,000' AGL view: basic 9 steps for obtaining DER data approval for MRA

5. Work with the DER to develop the repair or alteration data: Generally not a good idea to execute a repair or alteration and then hand it to a DER to ask for an approval.
6. Obtain 8110-3 DER approval forms for all data: Forms will list all applicable airworthiness requirements for which compliance has been shown.

The 10,000' AGL view: basic 9 steps for obtaining DER data approval for MRA

7. Execute the major repair or alteration to the aircraft: data or DER concurrence first . . . Cut second
8. Complete FAA form 337 using the approved data: Inspect repair against data, verify you have 8110-3s showing compliance with all of the necessary regulations, list those regs on the 337. You may need to mark parts to distinguish from OEM.

The 10,000' AGL view: basic 9 steps for obtaining DER data approval for MRA

7. Return aircraft to service and file 337s with OK City: (and sometimes with the plane) The DER will file 8110-3 with their FAA advisor.

FAA Order 8300.16 job aid for MRA

- Use the job aid in FAA Order 8300.16 to clarify if your proposed repair or alteration may be eligible for a DER data approval (ENG or EVL). There are 4 charts: normal and transport, aircraft and rotorcraft

AFS-300 MAJOR REPAIR/ALTERATION DATA APPROVAL
NORMAL, UTILITY, ACROBATIC, AND COMMUTER CATEGORY AIRPLANES

B	Structural Strength	
1	Changing primary structures (structures that carry flight, ground, or pressure loads as defined in the current edition of AC 23-13, Fatigue, Fail-Safe, and Damage Tolerance Evaluation of Metallic Structure for Normal, Utility, Acrobatic, and Commuter Category Airplanes).	ENG
2	Changes to significant structure to accommodate appliances installed on the exterior of the aircraft (i.e., Forward Looking Infrared (FLIR) equipment or system, cameras, firefighting, agricultural dispensing equipment, etc.) (See the current edition of AC 23-17, Systems and Equipment Guide for Certification of Part 23 Airplanes and Airships, for guidance for the substantiation of modifications involving installation of external equipment.)	ENG
3	Substituting airframe primary structural materials (i.e alloy substitutions).	ENG
4	Substituting an engine or propeller (such as replacing a reciprocating engine with a turbine engine).	STC

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What are some limits of using DER approved data to support MRA

If your MRA involves any of the following elements, it may require a special delegation for the DER, or will require a FA or CFA:

- AFMS or ICAW changes
- Airworthiness Limitation changes
- Ground or flight test plans
- Compliance inspections
- Modifications to critical or life limited parts
- Special conditions, ELOS findings, or AD

What about making parts?

AC 43-18 - Fabrication of Aircraft Parts by Maintenance Personnel

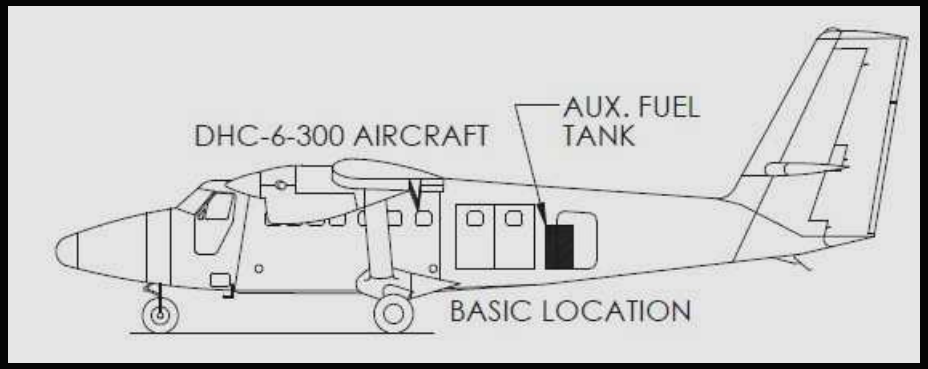
- *Critical Part – if it failed it would preclude continued safe flight and landing*
- *Cat 1 Parts – aka critical*
- *Cat 2 Parts – failure would not prevent continued safe flight and landing, but would reduce aircraft capability*
- *Cat 3 Parts – no effect on continued safe flight and landing*
- *PLEASE NOTE – 43-18 & Major Alteration Job Aid DO NOT ALWAYS AGREE – use your judgment*

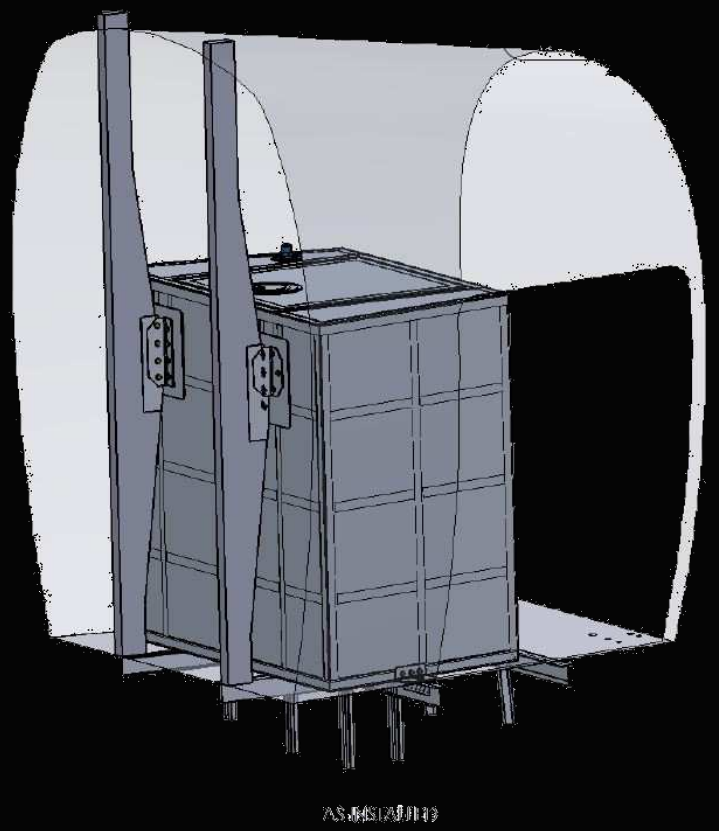
Doing it: Some examples from the last year

Example	Efficiency
Repairs like the OEM, with a small difference, including AOG	Often less costly and more timely than getting OEM support for a small change, AOG support means aircraft spend more time flying
Hardware replacement on TSOd wheel assy	Less costly hardware is more apt to be replaced often and break less
Bulkhead repairs – often due to corrosion	Saves replacing entire bulkheads, which could otherwise mean having to jig the aircraft
Pressure vessel cutouts and pass-thru, including antenna installations	Often less costly than OEM data, customizable installation locations to work around previously installed equipment
Computer rack installation	Allowed operator to get more value from their existing asset, with convertible interior configs to carry pax when not surveying
Antique aircraft parts/alterations	Allowed otherwise unsupported aircraft to operate with increased safety margins, with added value in customization
Seat installations and modifications	Allowed reconfigure of interior to accommodate new missions and customers, modified seats to add features that would be expensive from the OEM
Secondary structure composite repairs	Saved very expensive parts that may have otherwise been replaced
Repair station repair specifications	DERs can approve repair specs for repair stations to use over and over without additional FAA approval or involvement – very powerful
Support for former military aircraft	Operators have benefited from alterations including part fabrication to support otherwise ancient equipment, allowing safe continued operations

Examples

- Twin Otter Auxiliary Fuel Tank – Major Alteration

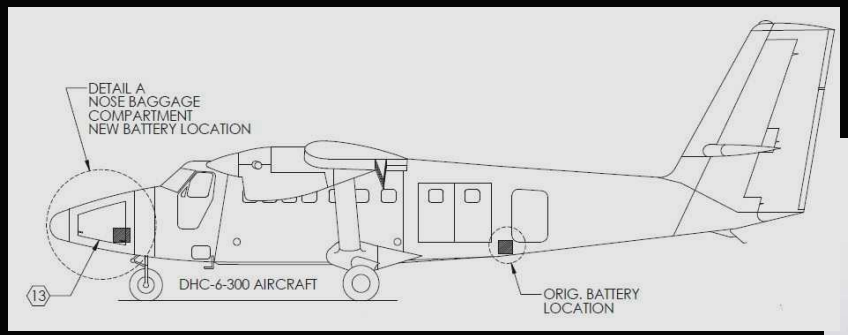


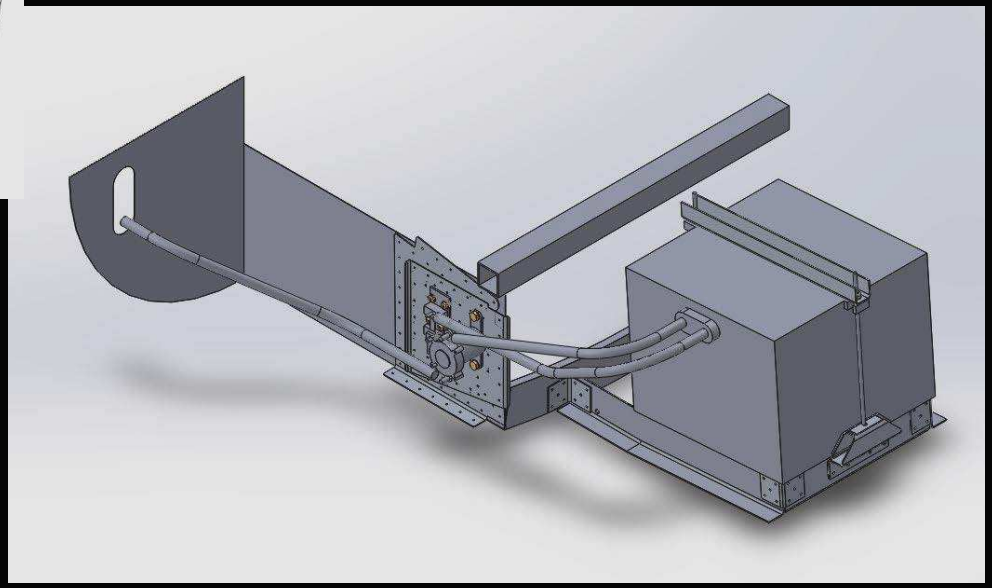


- Double Wall
- Full Structural Analysis, Powerplant, Electrical Systems
- 337 goes with Aircraft

Examples

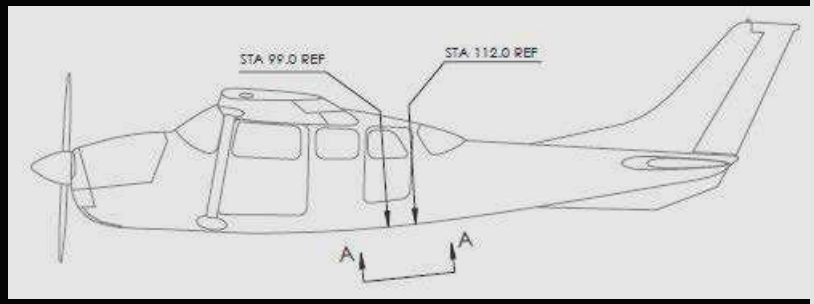
- Twin Otter Battery Relocation – Major Alteration

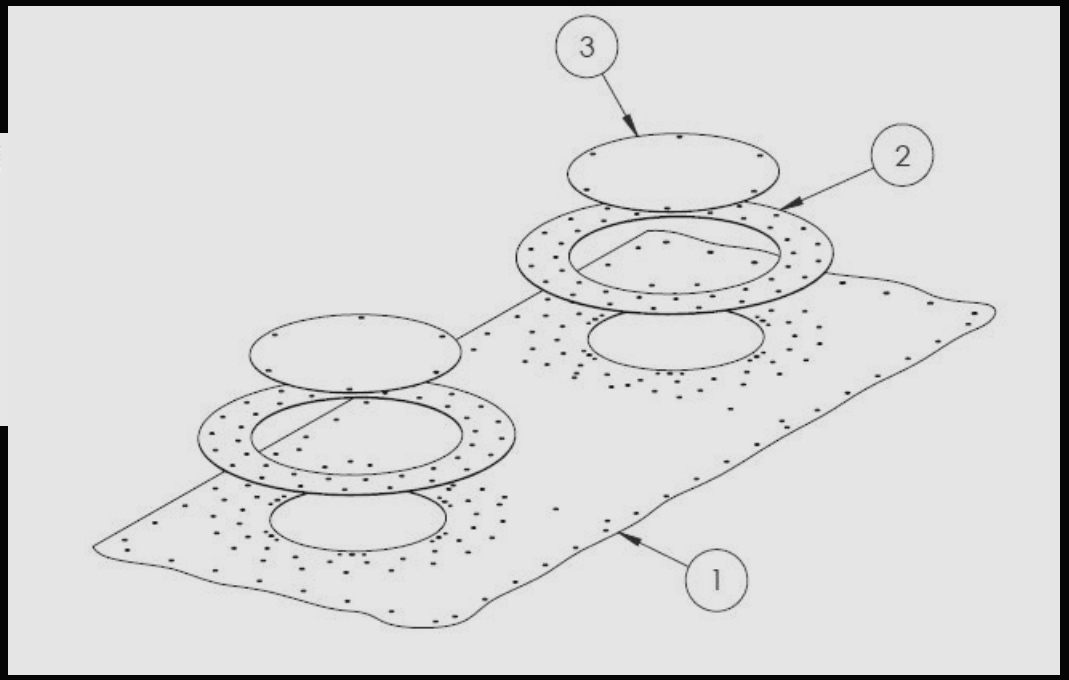




Examples

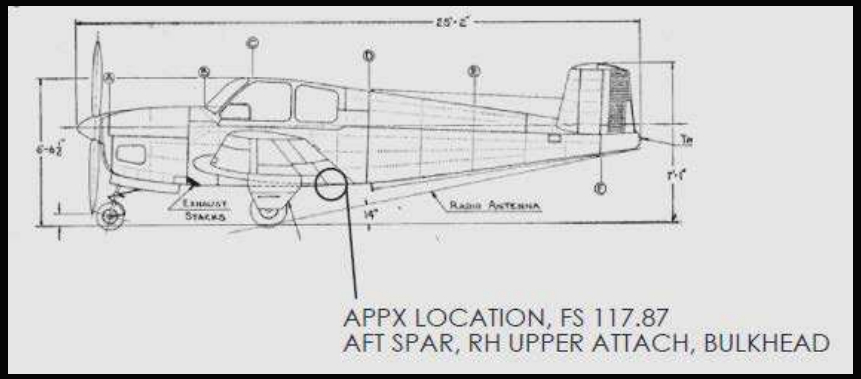
- 206 Camera Holes in belly – Major Alteration

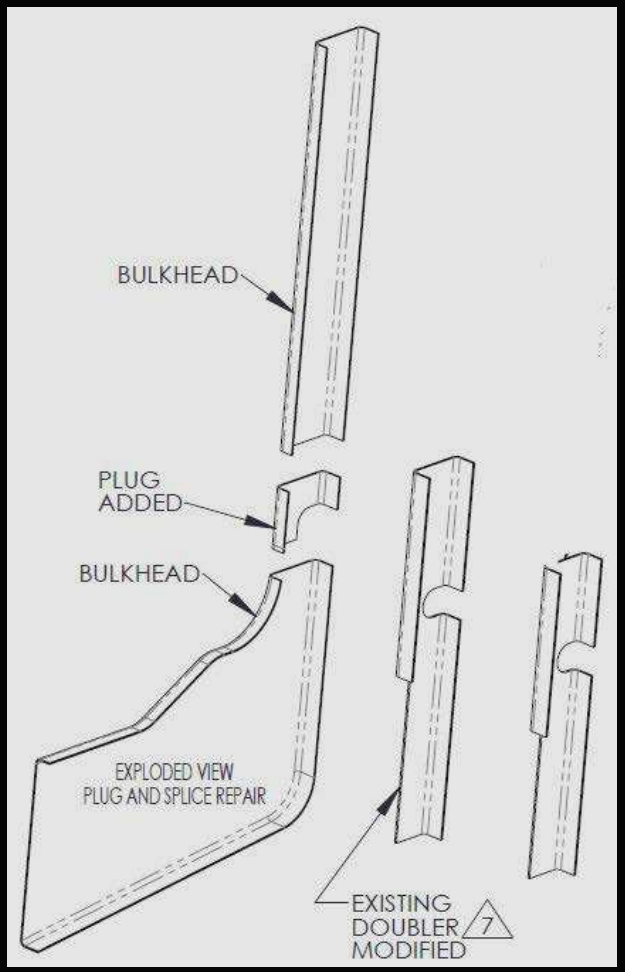




Examples

- Bonanza Wing Attach Bulkhead Corrosion – Major Repair





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Thank you!

Questions??

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