



Federal Aviation
Administration

Designated Engineering Representatives (DERs) for Composite Structures

May 17, 2011

Current Requirements

- Order 8110.37E, DER Handbook
- Order 8100.8C, Designee Mgmt Hdbk
- The only designation unique for composite materials is “Nonmetallic Materials/Processes”,
 - related to 14CFR 2x.603, 2x.605, and 2x.613

Authorized Areas

Functions and areas that *can* be authorized are defined by *white squares*. Each DER’s authority may be different, and is identified in their letter of appointment.

Delegated Functions

DELEGATED FUNCTIONS	AUTHORIZED AREAS															
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1 STATIC ANALYSIS																
2 DYNAMIC ANALYSIS																
3 FATIGUE ANALYSIS																
4 DESIGN AND CONSTRUCTION																
5 FLUTTER/GROUND VIBRATION																
6 SAFETY ANALYSIS																
7 FLOTATION & DITCHING ANALYSIS																
8 STRUCTURAL LOADING LIMITATIONS																
9 SERVICE DOCUMENTS																
10 MATERIAL & PROCESS SPEC.																
11 FLAMMABILITY																
12 DAMAGE TOLERANCE EVALUATIONS																

Note (1): Includes all airframe components: wing, fuselage, empennage, landing gear, flight controls, engine mounts, and special components. Does not apply to rotors.
 Notes (2) and (3): Select Specialty by Note number and sub-letter from lists below. General applies to all processes listed.

(2) Metallic Materials/Processes

- A - Materials & Processes - General
- B - Non-Destructive Inspection/Testing
- C - Metallurgy
- D - Metal Joining Processes
- E - Structural Adhesives
- F - Mechanical Fasteners
- G - Surface Treatment/Coatings
- H - Bearings

(3) Nonmetallic Materials/Processes

- A - Material & Processes - General
- B - Transparent (Glazed) Material
- C - Polymeric Materials
- D - Structural Adhesives
- E - Mechanical Fasteners
- F - Composites**
- G - Non-Destructive Inspection/Testing
- H - Surface Treatment & Coatings
- I - Structural Joining Methods



Possible Future Requirements: Regulation-Based Authorization

- **Additional regulations would be separated into “Metallic” and “Nonmetallic” categories**
 - For existing and future DERs
 - DERs could be approved for one or both types of structure
 - Some regulations are not applicable to nonmetallic structure
- **We would like to set a standard for knowledge and experience suitable for appointing a DER for nonmetallic structure.**

14 CFR	Metallic	Non-Metallic (Composite)
25.307	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
25.571	<input checked="" type="checkbox"/>	
25.621	<input checked="" type="checkbox"/>	

Possible Future Requirements: Regulation-Based Authorization

- For example, a DER could request authorization for Empennage, Static Strength, 25.301, .303, .305, .307, .631 for metallic and nonmetallic structure
- The DER must have significant industry experience that includes a direct working relationship with the **FAA for the specific regulation and type of structure.**
 - Same as current requirement for DER appointment.
 - The unique characteristics of composite structure require different approaches to demonstrating compliance.



Proposed Evaluation of Composite DER Qualifications

- **Existing DERs:**
 - Qualifications may be demonstrated through prior 8110-3 forms and their relationship with their FAA Advisor.
- **New DERs and those seeking expanded authorization with composites:**
 - Assessment of qualifications through evaluation of work experience and knowledge of the regulations
 - Other criteria related to training
 - On-the-Job-Training with a DER having composite authorization
 - Formal training (e.g., FAA Composite Structural Engineering Course), technical skill test or other equivalent education
 - Other thoughts?



Proposed Evaluation of Composite DER Qualifications

- **Previous work experience**
 - Type of structure (wing/fuselage/etc., metallic/nonmetallic)
 - Certification programs (TC or STC)
- **Knowledge of the regulations**
 - Including related FAA policies and guidance
- **Knowledge of composites**
 - Unique characteristics of composite structure
 - Overall composite certification process (acceptable means of compliance)
 - Material and process specifications
 - Material allowables and design values
 - Structural substantiation (appropriate analyses and tests)
 - Fatigue and damage tolerance (composite test considerations)
 - Composite inspection, damage characterization and repairs
 - Other considerations (manufacturing interface, fire safety, protective coatings)
- **Evaluation will be appropriate to the designation sought.**
 - Different expectations for a DER in Materials and Processes vs. Composite Wing Structure



Feedback Requested

- **How should composite designee qualifications be specified?**
 - Component type, delegated functions, safety awareness, technical skill level
- **What method or approach discussed during this forum has the potential to reliably identify critical composite designee qualifications?**

