Overview of Regulatory Requirements

(Composite Structural Modifications)

By: Michael Cann

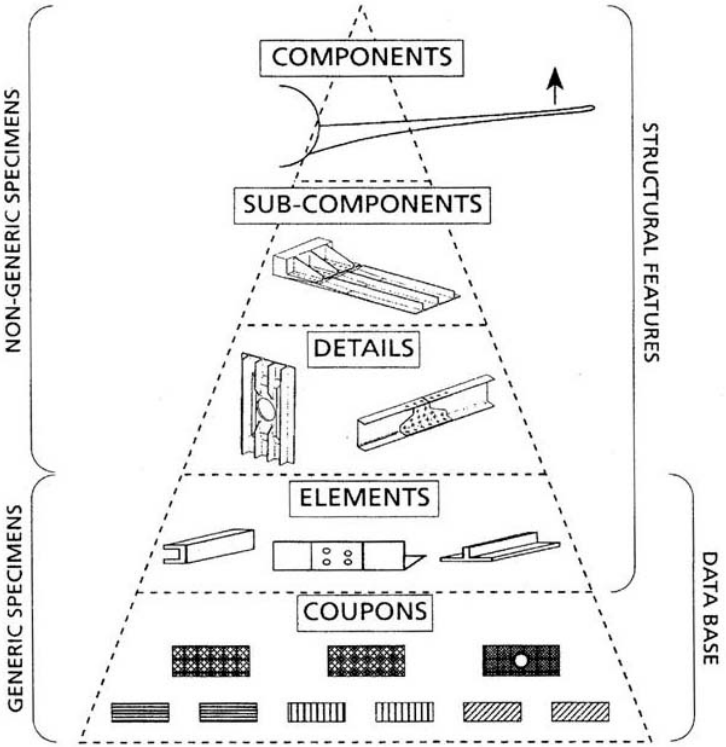
To: Modification Workshop

July 19, 2016


So this is the new guy from Accounting. He wants to know what we can do to get our airplane certified cheaper and faster...
Make it out of metal.
Composites Engineering
MCANN

Regulatory Requirements

- **This Presentation is meant as an overview.**
- **It isn't meant to provide changes or updates to regulations, but is meant to help set the mindset for the areas to be considered when dealing with composite modifications.**
- **It covers the basics to <u>START</u> conversation. This is not a lecture.**



Building Block Approach
AC 20-107B

Regulatory Requirements

- One of the Goals of this Workshop is to develop a consensus on applicable regulations…

As I am going through this presentation:

1. Think about the regulatory requirements that I am sharing,
2. Do you agree with the presentation?
3. Anything need clarified?
4. What was missed?
5. Feel free to speak up.

Regulatory Requirements

- **Breakdown into four major areas for discussion, even though they are related.**
  - Material Properties
  - Static Strength and Stiffness
  - Fatigue and Damage Tolerance
  - Function, Performance, and other Considerations

Regulatory Requirements

- **Material Properties**
  - Chemical composition, material definition, storage and handling considerations, allowables, processing requirements, environmental effects, etc

    - **25.601**- General. The airplane may not have design features or details that experience has shown to be hazardous or unreliable. The suitability of each questionable design detail and part must be established by tests.
    - **25.603** - Materials. The suitability and durability of materials used for parts, the failure of which could adversely affect safety, must-- (a) Be established on the basis of experience or tests;
      (b) Conform to approved specifications (such as industry or military specifications, or Technical Standard Orders) that ensure their having the strength and other properties assumed in the design data **[**;and
      (c) Take into account the effects of environmental conditions, such as temperature and humidity, expected in service.**]**
    - **25.605** - Fabrication methods. **[**(a)**]** The methods of fabrication used must produce a consistently sound structure. If a fabrication process (such as gluing, spot welding, or heat treating) requires close control to reach this objective, the process must be performed under an approved process specification.
      [(b) Each new aircraft fabrication method must be substantiated by a test program.**]**
    - **25.609** - Protection of structure. Each part of the structure must--
      (a) Be suitably protected against deterioration or loss of strength in service due to any cause, including--
      (1) Weathering; (2) Corrosion; and (3) Abrasion; and
      (b) Have provisions for ventilation and drainage where necessary for protection.

Regulatory Requirements

- **Material Properties (con't)**
  - Chemical composition, material definition, storage and handling considerations, allowables, processing requirements, environmental effects, etc
    - **25.613** - **[**Material strength properties and material design values.**]**
      (a) Material strength properties must be based on enough tests of material meeting approved specifications to establish design values on a statistical basis.
      [(b) Material design values must be chosen to minimize the probability of structural failures due to material variability. Except as provided in paragraphs (e) and (f) of this section, compliance must be shown by selecting material design values which assure material strength with the following probability:**]**
      (1) Where applied loads are eventually distributed through a single member within an assembly, the failure of which would result in loss of structural integrity of the component, 99 percent probability with 95 percent confidence. (2) For redundant structure, in which the failure of individual elements would result in applied loads being safely distributed to other load carrying members, 90 percent probability with 95 percent confidence.
      [(c) The effects of environmental conditions, such as temperature and moisture, on material design values used in an essential component or structure must be considered where these effects are significant within the airplane operating envelope.
      (d) [Reserved.]; (e) Greater material design values may be used if a "premium selection" of the material is made in which a specimen of each individual item is tested before use to determine that the actual strength properties of that particular item will equal or exceed those used in design.
      (f) Other material design values may be used if approved by the Administrator**.]**
    - **23.613** - Material strength properties and design values. [(b) Design values must be chosen to minimize the probability of structural failure due to material variability. **Except as provided in paragraph (e) of this section**…
      (c) The effects of temperature on allowable stresses used for design in an essential component or structure must be considered where thermal effects are significant under normal operating conditions.
      (d) The design of the structure must minimize the probability of catastrophic fatigue failure, particularly at points of stress concentration.

Regulatory Requirements

- **Material Properties (con't)**
  - Chemical composition, material definition, storage and handling considerations, allowables, processing requirements, environmental effects, etc
    - **27.613 & 29.613** -

      Material strength properties and design values.

      (a) Material strength properties must be based on enough tests of material meeting specifications to establish design values on a statistical basis.
      [(b) Design values must be chosen to minimize the probability of structural failure due to material variability. Except as provided in paragraphs (d) and (e) of this section, compliance with this paragraph must be shown by selecting design values that assure material strength with the following probability--
      (1) Where applied loads are eventually distributed through a single member within an assembly, the failure of which would result in loss of structural integrity of the component, 99 percent probability with 95 percent confidence; and
      (2) For redundant structures, those in which the failure of individual elements would result in applied loads being safely distributed to other load-carrying members, 90 percent probability with 95 percent confidence.**]**
      (c) The strength, detail design, and fabrication of the structure must minimize the probability of disastrous fatigue failure, particularly at points of stress concentration.
      [(d) Design values may be those contained in the following publications (available from the Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120) or other values approved by the Administrator:**]**
      (1) MIL-HDBK-5, "Metallic Materials and Elements for Flight Vehicle Structure".
      (2) MIL-HDBK-17, "Plastics for Flight Vehicles".
      (3) ANC-18, "Design of Wood Aircraft Structures".
      (4) MIL-HDBK-23, "Composite Construction for Flight Vehicles".
      [(e) Other design values may be used if a selection of the material is made in which a specimen of each individual item is tested before use and it is determined that the actual strength properties of that particular item will equal or exceed those used in design.**]**

Regulatory Requirements

- **Material Properties**
  - *Guidance Material*

➢ **AC 23-20 - Acceptance Guidance on Material Procurement and Process Specifications for Polymer Matrix Composite Systems**

➢ **AC 25.613-1 - Material Strength Properties and Material Design Values**

➢ **PS AIR100-2010-120-003 - Acceptance of Composite Specification and Design Values Developed using the NCAMP Process**

➢ **PS-AIR-100-120-07 - Guidance for Component Contractor Generated Composite Design Values for Composite Structure**

➢ **FAA Order 8110.4C, Paragraph 5-6 – Process Specification Review**

➢ **Great Reference by Regulation and associated ACs and Policy:**
https://www.faa.gov/aircraft/air_cert/design_approvals/transport/rules_acs_policy/

Regulatory Requirements

- **Static Strength and Stiffness**
  - **25.301** - Loads. (a) Strength requirements are specified in terms of limit loads (the maximum loads to be expected in service) and ultimate loads (limit loads multiplied by prescribed factors of safety). Unless otherwise provided, prescribed loads are limit loads. (b) Unless otherwise provided, the specified air, ground, and water loads must be placed in equilibrium with inertia forces, considering each item of mass in the airplane. These loads must be distributed to conservatively approximate or closely represent actual conditions. [Methods used to determine load intensities and distribution must be validated by flight load measurement unless the methods used for determining those loading conditions are shown to be reliable.] (c) If deflections under load would significantly change the distribution of external or internal loads, this redistribution must be taken into account.

  - **23.301*** - Loads. (a) Strength requirements are specified in terms of limit loads (the maximum loads to be expected in service) and ultimate loads (limit loads multiplied by prescribed factors of safety). Unless otherwise provided, prescribed loads are limit loads. (b) Unless otherwise provided, the air, ground, and water loads must be placed in equilibrium with inertia forces, considering each item of mass in the airplane. These loads must be distributed to conservatively approximate or closely represent actual conditions. Methods used to determine load intensities and distribution on canard and tandem wing configurations must be validated by flight test measurement unless the methods used for determining those loading conditions are shown to be reliable or conservative on the configuration under consideration. (c) If deflections under load would significantly change the distribution of external or internal loads, this redistribution must be taken into account. **[**(d) Simplified structural design criteria may be used if they result in design loads not less than those prescribed in Secs. 23.331 through 23.521. For airplane configurations described in appendix A, Sec. 23.1, the design criteria of appendix A of this part are an approved equivalent of Secs. 23.321 through 23.459. If appendix A of this part is used, the entire appendix must be substituted for the corresponding sections of this part.**]**

    ***Also see 23.302 for Canard or Tandem Wing Configurations.**

  - **27.301 & 29.301** - Loads. (a) Strength requirements are specified in terms of limit loads (the maximum loads to be expected in service) and ultimate loads (limit loads multiplied by prescribed factors of safety). Unless otherwise provided, prescribed loads are limit loads. (b) Unless otherwise provided, the specified air, ground, and water loads must be placed in equilibrium with inertia forces, considering each item of mass in the rotorcraft. These loads must be distributed to closely approximate or conservatively represent actual conditions. (c) If deflections under load would significantly change the distribution of external or internal loads, this redistribution must be taken into account.

Regulatory Requirements

- **Static Strength and Stiffness**

  - **25.303** - Factor of safety. **[**Unless otherwise specified, a factor of safety of 1.5 must be applied to the prescribed limit load which are considered external loads on the structure. When a loading condition is prescribed in terms of ultimate loads, a factor of safety need not be applied unless otherwise specified.**]**

  - **25.305** - Strength and deformation.

    (a) The structure must be able to support limit loads without any detrimental permanent deformation. At any load up to limit loads the deformation may not interfere with safe operation.
    (b) The structure must be able to support ultimate loads without failure for at least 3 seconds. However, when proof of strength is shown by dynamic tests simulating actual load conditions, the 3-second limit does not apply. Static tests conducted to ultimate load must include the ultimate deflections and ultimate deformation induced by the loading. When analytical methods are used to show compliance with the ultimate load strength requirements, it must be shown that--
    (1) The effects of deformation are not significant;
    (2) The deformations involved are fully accounted for in the analysis; or
    (3) The methods and assumptions used are sufficient to cover the effects of these deformations.
    (c) Where structural flexibility is such that any rate of load application likely to occur in the operating conditions might produce transient stresses appreciably higher than those corresponding to static loads, the effects of this rate of application must be considered.
    (d) **[**Reserved**.]**
    (e) The airplane must be designed to withstand any vibration and buffeting that might occur in any likely operating condition up to V_D/M_D, including stall and probable inadvertent excursions beyond the boundaries of the buffet onset envelope. This must be shown by analysis, flight tests, or other tests found necessary by the Administrator.
    (f) Unless shown to be extremely improbable, the airplane must be designed to withstand any forced structural vibration resulting from any failure, malfunction or adverse condition in the flight control system. These must be considered limit loads and must be investigated at airspeeds up to V_C/M_C.

Regulatory Requirements

- **Static Strength and Stiffness**

  - **23.305** - Strength and deformation.(a) The structure must be able to support limit loads without detrimental, permanent deformation. At any load up to limit loads, the deformation may not interfere with safe operation.
    [(b) The structure must be able to support ultimate loads without failure for at least three seconds, except local failures or structural instabilities between limit and ultimate load are acceptable only if the structure can sustain the required ultimate load for at least three seconds. However, when proof of strength is shown by dynamic tests simulating actual load conditions, the three second limit does not apply.**]**

  - **27.305 & 29.305** - Strength and deformation. (a) The structure must be able to support limit loads without detrimental or permanent deformation. At any load up to limit loads, the deformation may not interfere with safe operation.
    (b) The structure must be able to support ultimate loads without failure. This must be shown by--
    (1) Applying ultimate loads to the structure in a static test for at least three seconds; or
    (2) Dynamic tests simulating actual load application.

Regulatory Requirements

- **Static Strength and Stiffness**

- **25.307 -** Proof of structure. (a) Compliance with the strength and deformation requirements of this subpart must be shown for each critical loading condition. Structural analysis may be used only if the structure conforms to that for which experience has shown this method to be reliable. In other cases, substantiating tests must be made to load levels that are sufficient to verify structural behavior up to loads specified in § 25.305.(b) **[**Reserved.**]** (c) **[**Reserved.**]** (d) When static or dynamic tests are used to show compliance with the requirements of Sec. 25.305(b) for flight structures, appropriate material correction factors must be applied to the test results, unless the structure, or part thereof, being tested has features such that a number of elements contribute to the total strength of the structure and the failure of one element results in the redistribution of the load through alternate load paths.

- **23.307 -** Proof of structure. (a) Compliance with the strength and deformation requirements of Sec. 23.305 must be shown for each critical load condition. Structural analysis may be used only if the structure conforms to those for which experience has shown this method to be reliable. In other cases, substantiating load tests must be made. Dynamic tests, including structural flight tests, are acceptable if the design load conditions have been simulated. (b) Certain parts of the structure must be tested as specified in Subpart D of this part.

- **27.307 & 29.307 -** Proof of structure. (a) [Compliance with the strength and deformation requirements of this subpart must be shown for each critical loading condition accounting for the environment to which the structure will be exposed in operation. Structural analysis (static or fatigue) may be used only if the structure conforms to those structures for which experience has shown this method to be reliable. In other cases, substantiating load tests must be made.]
  (b) Proof of compliance with the strength requirements of this subpart must include--
  (1) Dynamic and endurance tests of rotors, rotor drives, and rotor controls;
  (2) Limit load tests of the control system, including control surfaces;
  (3) Operation tests of the control system;
  (4) Flight stress measurement tests;
  (5) Landing gear drop tests; and
  (6) Any additional test required for new or unusual design features.

Regulatory Requirements

- **Static Strength and Stiffness**

- **27.309 & 29.309** - Design limitations.

The following values and limitations must be established to show compliance with the structural requirements of this subpart:
(a) The design maximum weight.
(b) The main rotor r.p.m. ranges, power on and power off.
(c) The maximum forward speeds for each main rotor r.p.m. within the ranges determined under paragraph (b) of this section.
(d) The maximum rearward and sideward flight speeds.
(e) The center of gravity limits corresponding to the limitations determined under paragraphs (b), (c), and (d) of this section.
(f) The rotational speed ratios between each powerplant and each connected rotating component.
(g) The positive and negative limit maneuvering load factors.

Regulatory Requirements

- **Static Strength and Stiffness**

- **25.365 Pressure Loads** - For airplanes with one or more pressurized compartments the following apply:

(a) The airplane structure must be strong enough to withstand the flight loads combined with pressure differential loads from zero up to the maximum relief valve setting.

(b) The external pressure distribution in flight, and stress concentrations and fatigue effects must be accounted for.

(c) If landings may be made with the compartment pressurized, landing loads must be combined with pressure differential loads from zero up to the maximum allowed during landing.

(d) The airplane structure must be designed to be able to withstand the pressure differential loads corresponding to the maximum relief valve setting multiplied by a factor of 1.33 for airplanes to be approved for operation to 45,000 feet or by a factor of 1.67 for airplanes to be approved for operation above 45,000 feet, omitting other loads.

(e) Any structure, component or part, inside or outside a pressurized compartment, the failure of which could interfere with continued safe flight and landing, must be designed to withstand the effects of a sudden release of pressure through an opening in any compartment at any operating altitude resulting from each of the following conditions:

(1) The penetration of the compartment by a portion of an engine following an engine disintegration;

(2) Any opening in any pressurized compartment up to the size H_o in square feet; however, small compartments may be combined with an adjacent pressurized compartment and both considered as a single compartment for openings that cannot reasonably be expected to be confined to the small compartment. The size H_o must be computed by the following formula:

$H_o = Pa_s$ where,

H_o = Maximum opening in square feet, need not exceed 20 square feet.

$P = (A_s/6240) + .024$

A_s = Maximum cross-sectional area of the pressurized shell normal to the longitudinal axis, in square feet; and

(3) The maximum opening caused by airplane or equipment failures not shown to be extremely improbable.

(f) In complying with paragraph (e) of this section, the fail-safe features of the design may be considered in determining the probability of failure or penetration and probable size of openings, provided that possible improper operation of closure devices and inadvertent door openings are also considered. Furthermore, the resulting differential pressure loads must be combined in a rational and conservative manner with 1-g level flight loads and any loads arising from emergency depressurization conditions. These loads may be considered as ultimate conditions; however, any deformations associated with these conditions must not interfere with continued safe flight and landing. The pressure relief provided by intercompartment venting may also be considered.

(g) Bulkheads, floors, and partitions in pressurized compartments for occupants must be designed to withstand the conditions specified in paragraph (e) of this section. In addition, reasonable design precautions must be taken to minimize the probability of parts becoming detached and injuring occupants while in their seats.

Regulatory Requirements

- **Static Strength and Stiffness**
  - *Guidance Material*

➢ **AC 25-21 - Certification of Transport Airplane Structure**

➢ **AC 20-107B – Composite Aircraft Structure**

➢ **PS ANM-115-09-017 - Interaction of Interior Structures, Including Seats**

➢ **PS-ANM100-1987-00052 - Rapid Decompression into Normally Unpressurized Areas**

➢ **Great Reference by Regulation and associated ACs and Policy:**
https://www.faa.gov/aircraft/air_cert/design_approvals/transport/rules_acs_policy/

Regulatory Requirements

- **Fatigue and Damage Tolerance**

25.571 - Damage-tolerance and fatigue evaluation of structure.

(a) *General.* An evaluation of the strength, detail design, and fabrication must show that catastrophic failure due to fatigue, corrosion, manufacturing defects, or accidental damage, will be avoided throughout the operational life of the airplane. This evaluation must be conducted in accordance with the provisions of paragraphs (b) and (e) of this section, except as specified in paragraph (c) of this section, for each part of the structure that could contribute to a catastrophic failure (such as wing, empennage, control surfaces and their systems, the fuselage, engine mounting, landing gear, and their related primary attachments). For turbojet powered airplanes, those parts that could contribute to a catastrophic failure must also be evaluated under paragraph (d) of this section. In addition, the following apply:

(1) Each evaluation required by this section must include--

(i) The typical loading spectra, temperatures, and humidities expected in service;

(ii) The identification of principal structural elements and detail design points, the failure of which could cause catastrophic failure of the airplane; and

(iii) An analysis, supported by test evidence, of the principal structural elements and detail design points identified in paragraph (a)(1)(ii) of this section.

(2) Airworthiness Limitations Section (ALS) and Limit of Validity (LOV) - Inspection thresholds for the following types of structure must be established based on crack growth analyses and/or tests, assuming the structure contains an initial flaw of the maximum probable size that could exist as a result of manufacturing or service-induced damage:

(b) Damage-tolerance evaluation - fatigue, corrosion, or accidental damage; widespread fatigue damage

(c) *Fatigue (safe-life) evaluation.*

(d) *Sonic fatigue strength.* It must be shown by analysis, supported by test evidence, or by the service history of airplanes of similar structural design and sonic excitation environment,

(e) *Damage-tolerance (discrete source) evaluation.* The airplane must be capable of successfully completing a flight during which likely structural damage occurs as a result of-- (1) Impact with a 4-pound bird when the velocity of the airplane relative to the bird along the airplane's flight path is equal to V_C at sea level or 0.85 V_C at 8,000 feet, whichever is more critical;(2) Uncontained fan blade impact; (3) Uncontained engine failure; or (4) Uncontained high energy rotating machinery failure.

Regulatory Requirements

- **Fatigue and Damage Tolerance**
  - **23.571** - Metallic Pressurized Cabin Structures.
  - **23.573** - [Metallic] wing, empennage, and associated structures.
  - **23.574** - [Metallic damage tolerance and fatigue evaluation of commuter category airplanes.]
  - **23.575** - [Inspections and other procedures.]
  - 23.627 – Fatigue Strength

Regulatory Requirements

- **Fatigue and Damage Tolerance**

Part 27

- **27.571** - Fatigue evaluation of flight structure.
- **27.573** - Damage Tolerance and Fatigue Evaluation of Composite Rotorcraft Structures.

Part 29

- **29.571** - Fatigue Tolerance Evaluation of Metallic Structure.
- **29.573** - Damage Tolerance and Fatigue Evaluation of Composite Rotorcraft Structures.

Regulatory Requirements

- **Fatigue and Damage Tolerance**
  - *Guidance Material*

➢ **AC 20-107B – Composite Aircraft Structure**

➢ **Great Reference by Regulation and associated ACs and Policy:**
https://www.faa.gov/aircraft/air_cert/design_approvals/transport/rules_acs_policy/

Regulatory Requirements

- **Function, Performance, and other Considerations**

Lightning Strike Protection

For nonmetallic components, compliance may be shown by--
(1) Designing the components to minimize the effect of a strike; or
(2) Incorporating acceptable means of diverting the resulting electrical current so as not to endanger the airplane.

23.867 - Electrical bonding and protection against lightning and static electricity.
25.581 - Lightning Protection

27.610 - Lightning and static electricity protection.
29.610 - Lightning and static electricity protection.

Report Reference Number: AGATE-WP3.1-031027-043-Design Guideline
Work Package Title: WBS3.0 Integrated Design and Manufacturing
Date of General Release: March 1, 2002

Regulatory Requirements

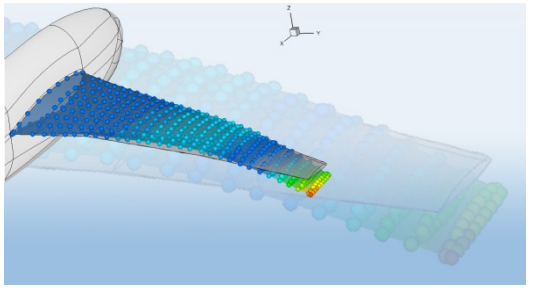
- **Function, Performance, and other Considerations**

Flutter

includes flutter, airfoil divergence, and control reversal

23.629 - Flutter
25.629 – Aeroelastic Stability Requirements

27.629 – Flutter
29.659 – Mass Balance
29.629 – Flutter and Divergence
29.659 – Mass Balance



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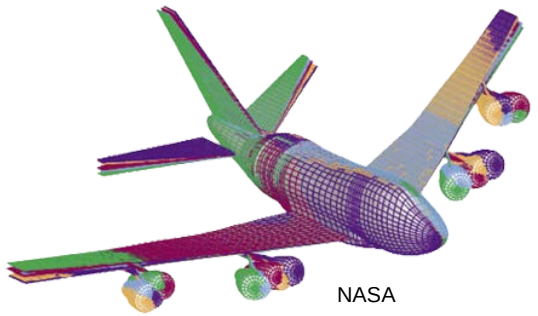


NASA

Regulatory Requirements

- Function, Performance, and other Considerations

- **Bird Strike**

  23.775 - Windows and windshields. (only*)

  25.631 - Bird Strike Damage. The empennage structure must be designed to assure capability of continued safe flight and landing of the airplane after impact with an 8-pound bird when the velocity of the airplane (relative to the bird along the airplane's flight path) is equal to V_C at sea level, selected under Sec. 25.335(a). Compliance with this section by provision of redundant structure and protected location of control system elements or protective devices such as splitter plates or energy absorbing material is acceptable. Where compliance is shown by analysis, tests, or both, use of data on airplanes having similar structural design is acceptable.

  27 - No current requirements, ARAC(?)

  29.631 - Bird Strike. The rotorcraft must be designed to ensure capability of continued safe flight and landing (for Category A) or safe landing (for Category B) after impact with a 2.2-lb (1.0 kg) bird when the velocity of the rotorcraft (relative to the bird along the flight path of the rotorcraft) is equal to V_{NE} or V_H (whichever is the lesser) at altitudes up to 8,000 feet.

Swiss A320 - Feb 2014 (Copenhagen)

Regulatory Requirements

- **Function and Performance**

Flammability

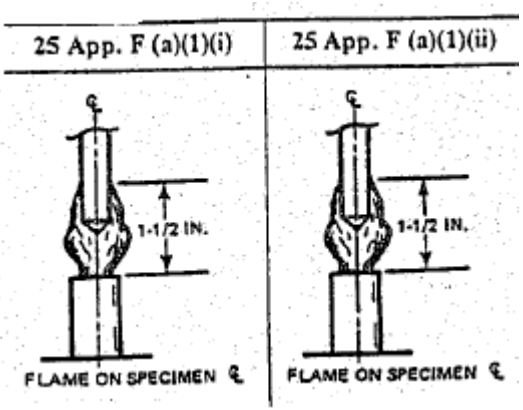
23.853 – Passenger and Crew Compartment Interiors
23.855 – Cargo and Baggage Compartment Fire Protection

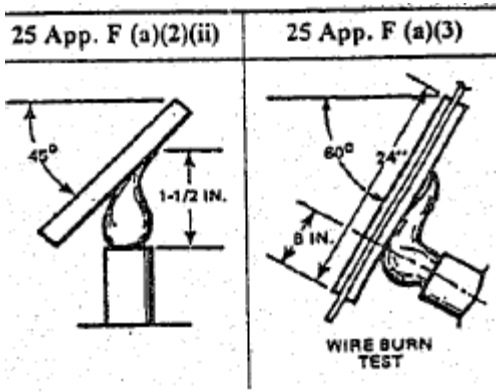
25.853 –Compartment Interiors
25.855 – Cargo or Baggage Compartment
25.867 – Fire Protection: Other Components (within Nacelle)

27.853 –Compartment Interiors*
27.855 – Cargo or Baggage Compartment**

29.853 –Compartment Interiors
29.855 – Cargo or Baggage Compartment

*Flame Resistant Requirements
**Flame and Fire Resistant Requirements





Regulatory Requirements

- **Function and Performance**

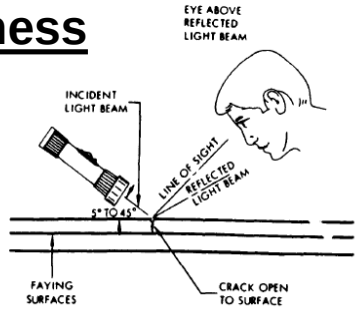
Inspections and Instructions for Continued Airworthiness

23.1529 – Instructions for Continued Airworthiness
23, Appendix G – Instructions for Continued Airworthiness
23.611 – Accessibility Provisions

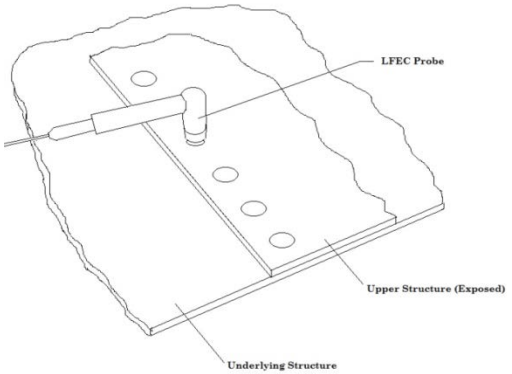
25.1529 – Instructions for Continued Airworthiness
25, Appendix H – Instructions for Continued Airworthiness
25.611 – Accessibility Provisions

27.1529 – Instructions for Continued Airworthiness
27, Appendix A – Instructions for Continued Airworthiness
27.611 – Inspection Provisions

29.1529 – Instructions for Continued Airworthiness
29, Appendix A – Instructions for Continued Airworthiness
29.611 – Inspection Provisions



CRACK INSPECTION USING REFLECTED LIGHT TO ENHANCE CONTRAST OF CRACKED SURFACE



Regulatory Requirements

- **Function, Performance, and other Considerations**

Special Factors

The factor of safety prescribed in Sec. 25.303 must be multiplied by the highest pertinent special factor of safety prescribed in Secs. 25.621 through 25.625 for each part of the structure whose strength is--
(a) Uncertain;
(b) Likely to deteriorate in service before normal replacement; or
(c) Subject to appreciable variability because of uncertainties in manufacturing processes or inspection methods.

- **25.619, 23.619, 27.619, 29.619**

Bearing Factors - 25.623, 23.623, 27.623, 29.623

Fitting Factors - 25.625, 23.625, 27.625, 29.625

- **PS-ANM100-1992-00045 - Interpretation of FAA requirements concerning special structural factors for transport airplane interior components**

Regulatory Requirements

- **Function, Performance, and other Considerations**

Other possible issues/considerations…

Crashworthiness

- Items of Mass within the Cabin
- Fuselage Drop Test (Impact Resistance)
- One Gear or Two Gear (Wheels Up) Landing
- Fuel Tank Frangibility
- Survivability
- Composite Seat Structure

Systems Interface and Considerations

- Impact on Grounding
- Electromagnetic Interference (EMI)
- Shielding/Transmissivity

Regulatory Requirements

- One of the Goals of this Workshop is to develop a consensus on applicable regulations…

SO,

1. What are your thoughts on the Regulatory Requirements?
2. Do you agree with the Presentation?
3. Anything need clarified?
4. What was missed?
5. Feel free to speak up.