The Promise

What constitutes a “major repair”? Learn the regulatory facts and how to train your FAA inspector so this minor issue doesn’t become a major pain in the ass.
Major and Minor Breakout Session

Summary of Presentation

• Why do you care if something is a repair or an alteration?
• How do you determine whether something is a repair or alteration?
• Why do you care if something is major or minor?
• How do you determine whether the repair or alteration is major or minor?

Major and Minor Breakout Session

Why Do You Care?
Repair v. Alteration

• Starting with the regulations – no definition for either repair or alteration
• Definition for maintenance (section 1.1)
• Definition for major and minor repairs and alterations (section 1.1)
• Special requirements for major repairs and alterations
  – Recordkeeping
  – Approved data
Why Do You Care?  
Repair v. Alteration

• With no regulatory definition – use available language from section 43.13 – returning an article to at least its original condition

• Aviationglossary.com/repair/ – The restoration of an aircraft component to its previous state. (Apparently aircraft aren’t repaired only components.)

• What is the “original condition” or “previous state”?

Repair equals “original condition”
  – The technical equivalent to the required design specification
  – Having the same “form, fit and function” even if not exactly the same as “new”

• Alteration “changes” the “condition” and once incorporated becomes the new “original condition”
Determining Repair v. Alteration

• At what level is the analysis necessary?
  – Article being worked?
  – Product upon which the article will be installed?

• Regulations tie recordkeeping to articles and products—but an article can be changed without impacting the product

Determining Repair v. Alteration

• Consistency is the key
  – Look at the RESULT of the action from a
    o Technical viewpoint—does the article or product know the difference?
    o Practical viewpoint—how will the determination impact the business and regulatory relationship?
    o Customer viewpoint—does the customer have to determine or can you?
Determining Repair v. Alteration

• Consistency is the key
  – Create a procedure that can be applied and defended within the regulations AND that creates the proper data no matter what.
  – Apply the procedure every single time and make adjustments to documentation as you gain experience.

Major – Minor
Why Do You Care?

• Recordkeeping
  – Section 43.9 applies to all maintenance, preventive maintenance, rebuilding and alterations
  – Requires description of work performed (or reference to data acceptable to the agency)
  – Major repairs and alterations require “more” paperwork
Major and Minor Breakout Session

Major – Minor

Why Do You Care?

• Recordkeeping
  – Major repair and alteration paperwork
    o Appendix B
      ▪ Repairs – Form 337 or repair station’s “work order” with the appropriate language
      ▪ Alterations – Form 337 with “tacit” acceptance of air carrier paperwork instead
    o Fractional owners – section 91.1439
    o Air carriers – sections 121.380, 121.707 and 135. 439

• Major repairs may change methods, techniques and practices for performing maintenance “the next time”
• Major alterations may include changes to—
  – Flight manuals
  – Airworthiness limitations
Major – Minor
Why Do You Care?

• Approved technical data must support major repairs and alterations
  – Technical data is approved by the national aviation authority
    o The agency itself
    o APPROPRIATE designee
  – Approval based upon a showing of compliance with the applicable airworthiness standard
    o Repairs return to “original condition”
    o Alterations to a “new” airworthy condition

• Major repairs and alterations cannot be approved for return to service by just anyone, must be—
  – Air carrier
  – Appropriately rated repair station
  – Mechanic with
    o Airframe rating and
    o Powerplant rating and
    o Inspection Authorization
Major and Minor Breakout Session

Determining Major v. Minor

• Always start with the regulations – definition of minor is anything that is not major – can’t have a “minor-major” or “major-minor”
• Major repairs – “if not properly done”
  – Engineering aspects—was the repair developed properly?
  – Application aspects—can the repair be implemented properly?

• Major alterations – does “not listed in the [product’s] specification” mean—
  – Not installed on the aircraft, engine or propeller being worked on?
  – Not listed in the type design of the product being worked on?
• Alterations do not change type design (although the “field approval” guidance mixes this up terribly, the regulations don’t).
Determining Major v. Minor

• “Might appreciably” effect enumerated items and conditions – can be measured within the airworthiness standards for the article and product
  – Repairs return the article to at least its original condition—you are not “recertifying” the product, just validating the result of action
  – Alterations change the article’s condition
  – Both must show the result is within the airworthiness standards and parameters of the article

• Cannot be done by accepted practices—is there a standard procedure from or by—
  – Design or production approval holder?
  – Military source?
  – Aerospace source?
  – Industry source?

• Cannot be done by elementary operations—
  – Is the operation in writing and repeatable?
  – Does any step require special education, skills or training?
Determining Major v. Minor

- Conservative approach – data doesn’t know the difference, neither does the mechanic implementing the action
  - Validate all actions FIRST
    - Determine end result
    - Determine steps to reach the end result
    - Determine whether the end result will be “airworthy”
  - Document the action and results within the regulatory framework

- When in doubt, think about why the action could be—
  - Repair
  - Alteration
  - Aspects of both

- Document the reasons behind the determination (e.g., based upon technical data the action is a repair because it will return the article to the condition anticipated by the original design)
Conclusion

• Why do you care if something is a repair or an alteration?
  – One returns an article to an original condition
  – One changes the article’s condition
  – Both analyzed within the airworthiness standards for regulatory purposes
  – Businesses may add to but cannot change the regulations—must understand the ramifications of “labeling” the action

• How do you determine whether something is a repair or alteration?
  – Systemic application of analysis
  – Understand the original condition within
    o The regulations
    o The customer’s demands and expectations
  – Focus, focus, focus on the technical aspects to establish a repeatable procedure
  – Document the reasons behind the particular label in each instance
Conclusion

• Why do you care if something is major or minor?
  – Hoopla surrounding changes from minor to major
  – Recordkeeping is different
  – Technical data requirements are different
  – Persons that can approve the work for return to service are different

• How do you determine whether the repair or alteration is major or minor?
  – Know the original condition
  – Know the regulations applicable to the contemplated action
  – Develop and validate the action
  – Determine whether the action is a repair, alteration or both
  – Label as major or minor but always have the data to support the action!
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