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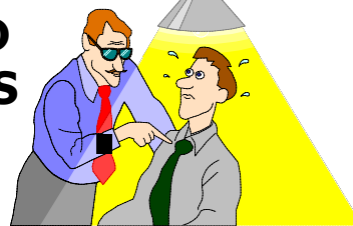
Major Repairs & Major Alterations

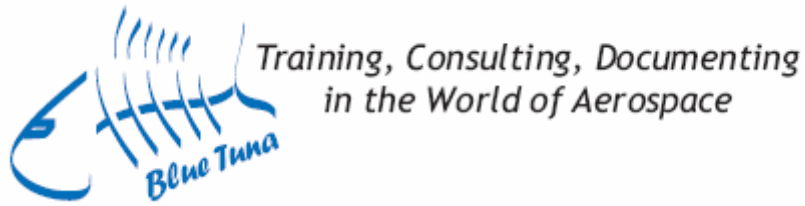
MAJOR REPAIRS AND MAJOR ALTERATIONS



Purpose

**TO PROVIDE AVIATION
TECHNICIANS A FRANK
DISCUSSION ON MAJOR
REPAIRS AND
ALTERATIONS**





Major Repairs & Major Alterations



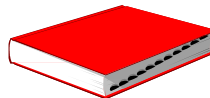
GOAL:

- „ **PROVIDE THE AVIATION TECHNICIANS WITH A GOOD REVIEW OF THE FAA POLICY ON MAJOR REPAIRS AND ALTERATIONS**



COURSE OVERVIEW

- „ **REGULATORY AUTHORITY**
- „ **IMPORTANT RULES**
- „ **A/W AND PERFORMANCE STANDARDS**
- „ **DEFINITIONS**





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COURSE

OVERVIEW:

- „ **MAJOR REPAIRS**
- „ **MAJOR ALTERATIONS**
- „ **Data (Approved and acceptable)**
- „ **STC PROCESS**
- „ **FAA FIELD APPROVALS**

REGULATORY AUTHORITY





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THE LAW



„

**FEDERAL AVIATION ACT OF
1958 AS AMENDED BY
TITLE 49 U.S. CODE
PUBLIC LAW 103-272**



**FEDERAL AVIATION
ACT : PUBLIC LAW 103-272**

Allows for the issue of:

- „ **Type Certificates**
- „ **Production Certificates**
- „ **Airworthiness**
- Certificatesand....**



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FEDERAL AVIATION ACT OF 1958: TITLE 49

„ **ALSO ALLOWS FOR THE
DEVELOPMENT OF :**

RULES



RULES YOU SHOULD KNOW

„ **LET'S GO OVER SOME OF THE
AIRWORTHINESS RULES THAT
DEFINE ONE OF THE MINIMUM
STANDARDS THAT A MAJOR
REPAIR OR ALTERATION MUST
MEET.**



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RULES:



**PART 21 - Certification Procedures
for Products and Parts.**

**PART 23 - (CAR--3) Airworthiness
Standards, Normal, Utility, Acrobatic
and Commuter.**

**PART 25 - (CAR--4b) Airworthiness
Standards, Transport.**

RULES:



**PART 29 (CAR 7) Airworthiness
Standards) Airworthiness Standards,
Transport Helicopters**

Part 31, Manned Free Balloons.

**PART 33 (CAR 13) Airworthiness
Standards, Aircraft Engines.**





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RULES :

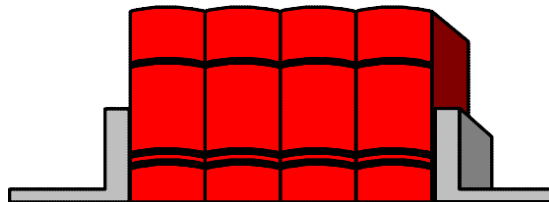
„ **PART 35, (CAR 14)**
**AIRWORTHINESS STANDARDS,
PROPELLERS.**

„ **PART 36, AIRCRAFT NOISE**
**REQUIREMENTS , EXCEPT FIRE
FIGHTING AND AGRICULTURAL.**



RULES:

„ **PART 39 AIRWORTHINESS
DIRECTIVES**





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Question?

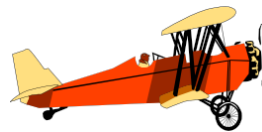
**What do all these
regulations have in
common?**



Answer

They set:

**Airworthiness
Standards !**





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THESE FAR SET

PART-39

PART-43

PART-91

PART-121

PART-135

PART-145

PERFORMANCE

STANDARDS



**THE TWO STANDARDS MAJOR
REPAIRS AND ALTERATIONS
MUST MEET ARE:**

- „ **Airworthiness Standards**
- and**
- „ **Performance Standards**

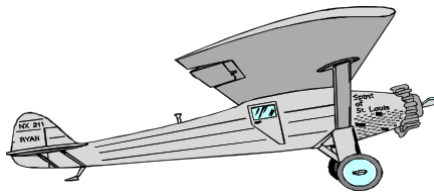


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Why TWO STANDARDS ?



**BECAUSE FOR AN
AIRCRAFT TO BE
"AIRWORTHY" IT MUST
MEET TWO STANDARDS**



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DEFINITION OF "AIRWORTHY"

„ **Airworthy is when the aircraft meets its type design or properly altered condition and is in a condition for safe operation.**

(Ref: Act of 58 and the Standard A/W certificate and the glossary of AC 43.13-1B)



AIRWORTHY

„ **TYPE DESIGN =
AIRWORTHINESS STANDARD**

„ **CONDITION FOR SAFE
OPERATION = PERFORMANCE
STANDARD**



DEFINITIONS

Major Repair (Ref: FAR 1)

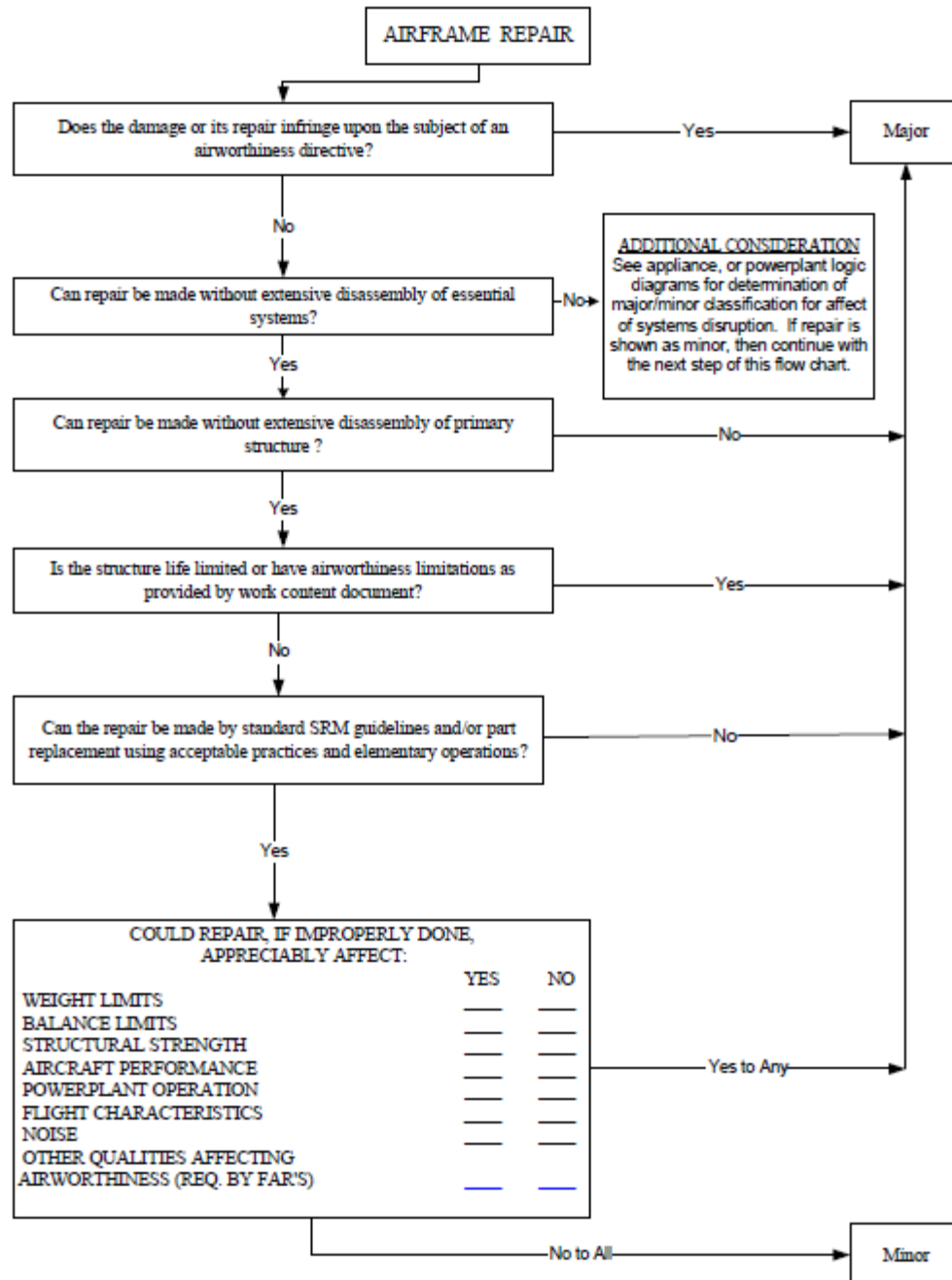


- 1. A repair that, if improperly done might appreciable effect weight, balance, structural strength, performance characteristics or other qualities affecting airworthiness or:**
- 2. That is not done according to ACCEPTED practices or cannot be done by elementary operation.**



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Major Alteration

(Ref: FAR 1)

is an alteration not listed in the A/C, engine, or propeller specifications.

1. That might appreciable affect weight, balance, structural strength, performance, powerplant operation, flight characteristics, or other qualities affecting airworthiness: or

Major Alteration

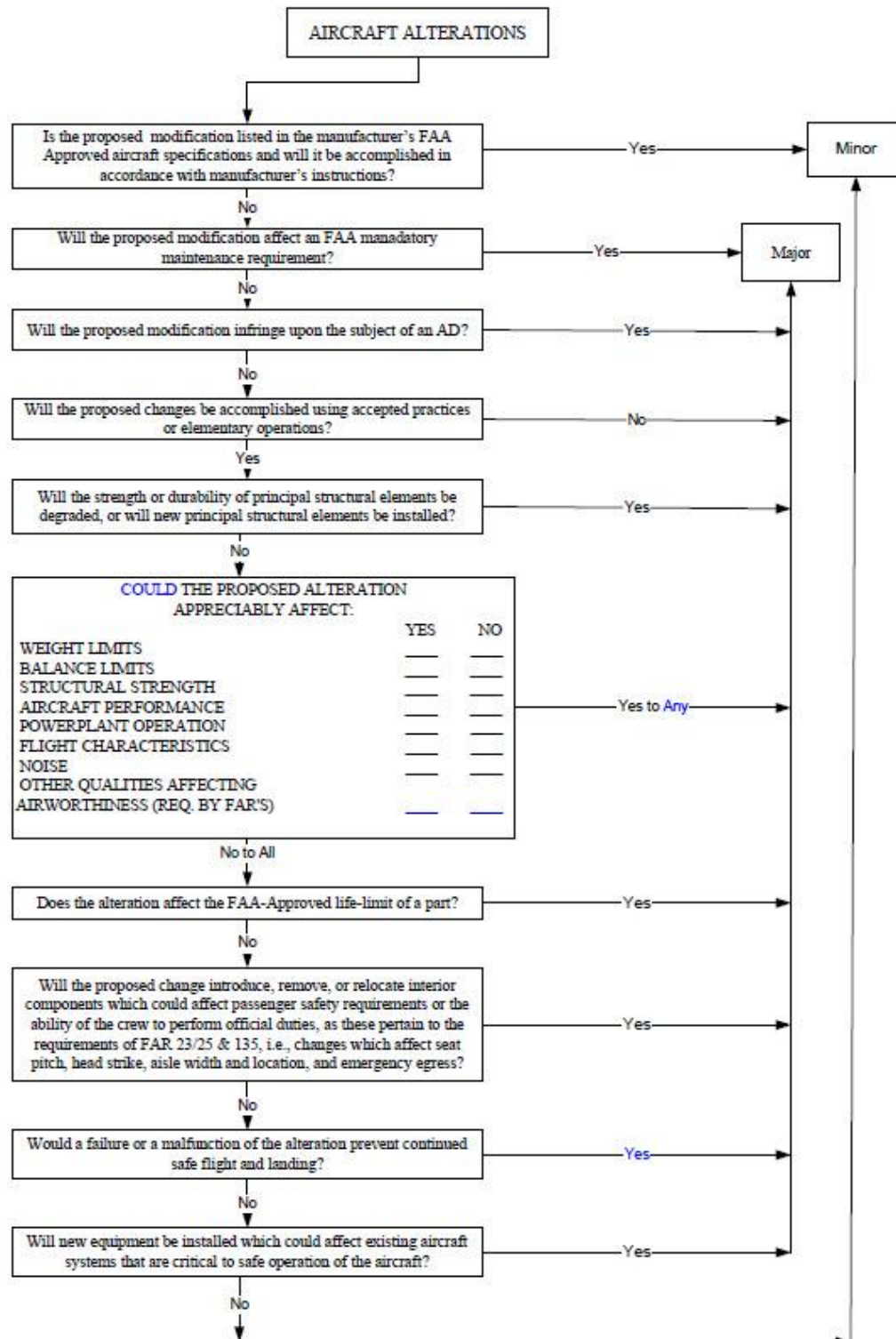
(Ref: FAR 1)

2. That is not done according to accepted practices or cannot be done by elementary operations.



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Question?

**What do the words :
“Other qualities affecting
airworthiness” mean to
you?**



OTHER QUALITIES

- „ TYPE OF OPERATIONS
- „ ENVIRONMENTAL CONDITIONS
- „ UTILIZATION RATE
- „ AGE OF THE AIRCRAFT AND IT'S COMPONENT PARTS
- „ PREVIOUS MAINTENANCE HISTORY



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QUESTION ?

„ **WHAT IS THE BASIC
DIFFERENCE BETWEEN A
MAJOR REPAIR AND A
MAJOR ALTERATION?**



MAJOR REPAIR ? MAJOR ALTERATION?

„ **A MAJOR REPAIR ALWAYS RETURNS
THE ITEM BACK TO ITS ORIGINAL
TYPE DESIGN.**

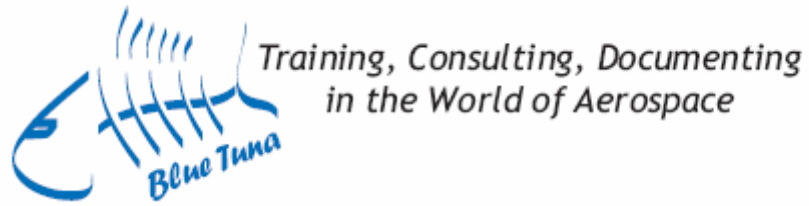
„ **A MAJOR ALTERATION IS A
CHANGE TO THE ORIGINAL TYPE
DESIGN.**

Major Repair? Or is it a Major Alteration?



QUESTION?

„ SINCE IT IS THE AVIATION
TECHNICIAN WHO DECIDES IF
A REPAIR IS MAJOR OR
MINOR,
THE GMM CHAPTER III,
94 PROVIDES GUIDANCE
ON WHICH IS WHAT?



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TIME TO LOOK AT

DATA



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Data can be:

Written/Typed Instructions

WEIGHT AND BALANCE REPORTS

DESIGN Drawings

Photographs

Documents STRESS ANALYSIS

ELECTRICAL LOADS CHARTS



DATA MUST PROVIDE

„ **A DETAILED, COMPLETE, AND
ACCURATE DESCRIPTION OF THE
PROPOSED ALTERATION OR
REPAIR.**

„ **A DESCRIPTION OF REQUIRED
TESTING PROCEDURES. (E.G.
FLAMMABILITY OR NOISE)**



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DATA ADDRESSES TWO AREAS ONLY:

„ **TYPE DESIGN (FAR 21.31)**

„ **METHODS, TECHNIQUES,
AND PRACTICES TO
PERFORM MAINTENANCE.**



**There are two kinds
of Data!**

**“Acceptable”
and “Approved”**



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ACCEPTABLE DATA

OK



ACCEPTABLE DATA

**Acceptable Data is used for
all maintenance, except
major repairs and major
alterations.**

(Ref: 43.13)



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KINDS OF ACCEPTABLE DATA

- „ **AC 43-13-1B or 2A.**
- „ **MFG's Service Manuals for aircraft originally TC after Jan. 1, 1980.**
- „ **MFG's Service Bulletins.**
- „ **PART 121/135 Operator's Manuals.**

APPROVED DATA

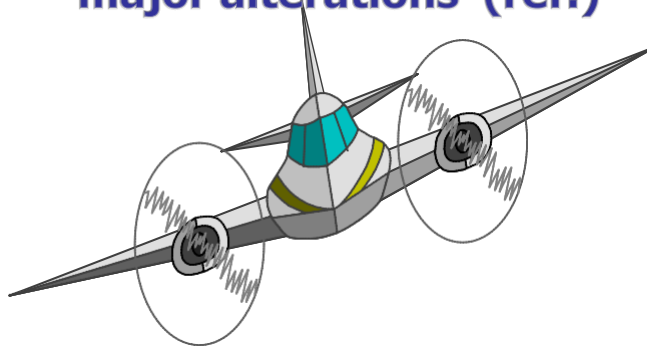


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**Approved Data is used for
all major repairs and
major alterations (ref:)**



FAR REFERENCES :

„ Mechanics -----FAR 43.7
„ IA-----FAR 65.95
„ AIR TAXI-----FAR 135.437
„ AIR CARRIER-----FAR 121.379
„ REPAIR STATION-----FAR 145.201



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KINDS OF APPROVED

DATA: FAA ORDER 8300.10 CHG 15

- „ **TYPE CERTIFICATE DATA AND SPECIFICATIONS.**
- „ **S. T. C.**
- „ **ADs**
- „ **FAA APPROVED STRUCTURAL REPAIR MANUALS.**



KINDS OF APPROVED

DATA:

- „ **DESIGNATED ENGINEERING REPRESENTATIVE. (DER) (8110-3 statement of compliance)**
- „ **ORGANIZATION DESIGNATION AUTHORIZATION (ODA).**
- „ **APPLIANCE MANUFACTURER'S MANUALS. (for repairs only)**



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KINDS OF APPROVED DATA:



- „ **MFG's Service Manuals for aircraft originally TC prior to Jan. 1, 1980.**
- „ **The data must be appropriate,**
- „ **Applicable, and not contrary to manufacturer's instructions.**
- „ **Same as AC 43.13-1b requirements.**

KINDS OF APPROVED DATA:



- „ **FAA APPROVED DATA.**
- „ **SFAR 36 REPAIR DATA.**
- „ **FAA FORM 337 USED TO APPROVE MULTIPLE REPAIRS OR ALTERATIONS BY THE ORIGINAL MODIFIER.**



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KINDS OF APPROVED DATA:



- „ **TECHNICAL STANDARD.**
- „ **ORDER AUTHORIZATION. (TSO)**
- „ **PARTS MANUFACTURER.**
- „ **AUTHORIZATION. (PMA)**
- „ **ODA**

KINDS OF APPROVED DATA:



- „ **CAA FORM 337, DATED PRIOR TO 10/1/55.**
- „ **FOREIGN DATA IN THE FORM OF A SERVICE BULLETIN, FOR USE ON U.S. CERTIFICATED, FOREIGN MFG. AIRCRAFT WHEN APPROVED BY THE FOREIGN CAA OF THE COUNTRY OF DESIGN UNDER A BILATERAL AGREEMENT.**



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KINDS OF APPROVED DATA:

- .. **FAA AND TRANSPORT CANADA CIVIL AVIATION (TCCA) HAVE A M.O.U. THAT SAYS THAT CERTAIN TCCA AND TCCA DELEGATE REPAIR DESIGNS ARE CONSIDERED FAA APPROVED. THESE ARE LISTED ON THE WEBSITE BELOW:**
- .. **[HTTP://WWW.TC.GC.CA/AVIATION/REGSERV/CARAC/CARS/CARS/A513S10E.HTM](http://www.tc.gc.ca/aviation/regserv/carac/cars/cars/A513S10E.htm)**

KINDS OF APPROVED DATA:

- .. **DATA IN THE FORM OF APPLIANCE TYPE APPROVAL ISSUED BY THE MINISTER OF TRANSPORT CANADA FOR THOSE PARTS THAT DO NOT HAVE A TSO. (DOT CANADA CERTIFICATE IN INSTALLATION MANUAL)**



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KINDS OF APPROVED DATA:

- „ **ANY FAA-APPROVED SERVICE BULLETINS AND LETTERS OR SIMILAR DOCUMENTS.**

- „ **ANY OTHER DATA APPROVED BY THE ADMINISTRATOR.**

Approved Data-----For Repairs Only—Policy Change

Use AC 43.13-IB if the repair is:

- „ **Appropriate to the product.**
- „ **Applicable to the repair.**
- „ **Not contrary to mfg's data.**
- „ **Must reference AC's chapter, page and paragraph where data is found.**



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QUESTION ?

„ **WHERE IS THE AUTHORITY
THAT GIVE THE MECHANIC, IA
TO USE THE ACCEPTABLE
REPAIR DATA IN AC 43.13-1B
AS APPROVED DATA FOR A
MAJOR REPAIR ?**



ANSWER

„ **PERMISSION BY THE FAA TO
USE THE ACCEPTABLE DATA IN
AC 43-13-1B AS APPROVED
DATA IS FOUND ON THE FIRST
PAGE (SIGNATURE PAGE) OF
THE AC .**



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HERE IS ANOTHER POLICY CHANGE:

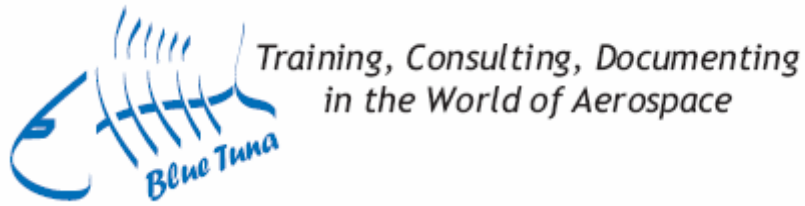


- „ **FAA NOTICE 8300.122, dated 7/28/05, now permits Manufacturer's repair data to be used as "approved data". So a field approval is not required for repairs listed in MFG. Maintenance manuals.**

Data that is not approved or acceptable



- „ **Sales Catalog Information.**
- „ **Newsletters.**
- „ **Magazines articles.**
- „ **Parts Manual (Illustrated).**
- „ (FAA Order 8130.2E page42 para 44)



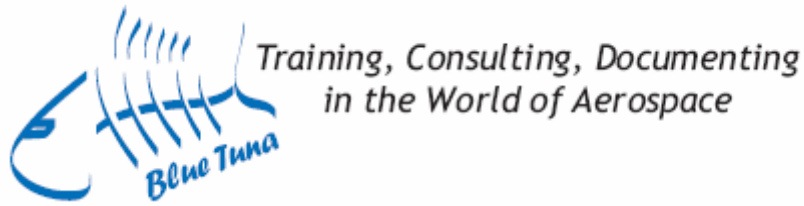
Major Repairs & Major Alterations



IMPORTANT NOTICE

**If your not sure
SUPERVISOR!**

**SUPPLEMENTAL TYPE
CERTIFICATES**



Major Repairs & Major Alterations



Supplemental type
Certificate (STC) is:

A major change to a type design but not great enough to require a new application for type certificate. (Ref: 21.113)



S.T.C. Process :
Data submitted

- „ Application made to FAA
- „ FAA assigns an engineer
- „ Applicant and FAA meet
- „ Development of a mutually acceptable program



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STC PROCESS : Data submitted (cont.)



- „ **SUBMIT DATA: SUCH AS
DRAWINGS, PROCESSES, PARTS
USED, ETC.**
- „ **FLIGHT MANUAL SUPPLEMENTS.**
- „ **OPERATING MANUALS.**
- „ **COPY OF INSTALLATION
INSTRUCTIONS.**

S.T.C. Process Data submitted (cont.)



- „ **Rating of electrical
equipment**
- „ **Weight and balance**
- „ **Placards**
- „ **Markings on instruments**

**ODA PROCESS IS EXPLAINED
AS ALTERNATIVE**



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T.C. Process : Data submitted (cont.)

- .. **Any aircraft certified after January 28, 1981 a manual for continued airworthiness is required. (Ref 21.50)**
- .. **One copy of all substantiating data showing compliance to the applicable FAR or CAR.**



Suggestion

Designated Engineering Rep. (ODA) can be a engineer or test pilot who for a fee will represent the FAA for specific certification functions. They can speed up the process but use of DER's are not mandatory.



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S.T.C. Process

- „ **Development of the type inspection authorization (T.I.A.)**
- „ **TIA sets the requirements for**
 - **Conformity Inspections**
 - **Flight tests**
- „ **Satisfactory Completion of the Inspections and Tests an S.T.C. is issued.**



S.T.C. can be:

- „ **Transferred from one individual to another or:**
- „ **Sold an an “approved” process for a major repair or alteration**



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Warning!

Before you Buy an S.T.C.

- „ **Ensure that it is compatible
with other STC on your aircraft.**

- „ **Ensure it is for your particular
make and model aircraft.**



WARNING

- „ **PART 91.403 GENERAL: REFLECTS THE
1996 LAW TO PROTECTED INTELLECTUAL
DATA.**

- „ **IT REQUIRES INSTALLERS OF AN STC TO
HAVE PERMISSION FROM THE STC
HOLDER TO USE THE STC. THIS IS
USUALLY IN THE FORM OF A LETTER
FROM THE STC HOLDER TO THE BUYER.**



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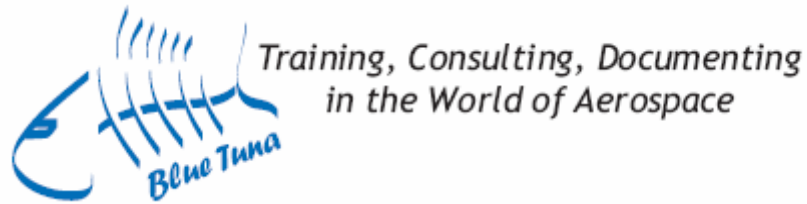


Field Approvals

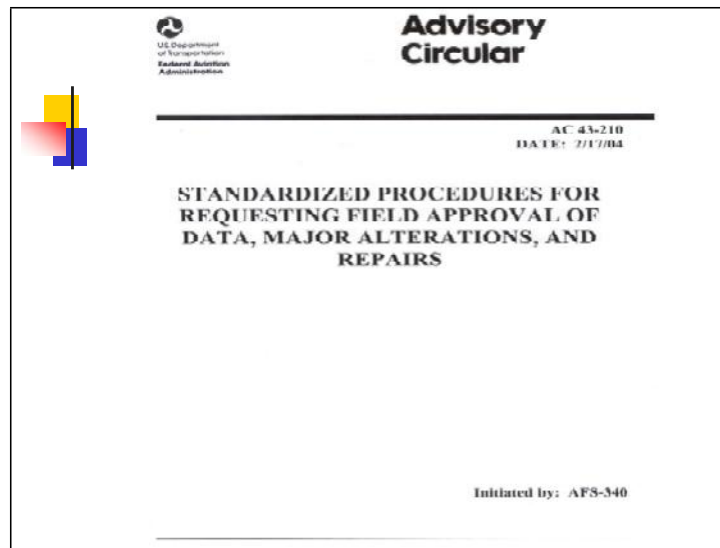
**If you are doing field
approvals you need to read:**



**FAA ADVISORY CIRCULAR (AC)43.210
STANDARDIZED FIELD APPROVAL OF
DATA, MAJOR ALTERATIONS AND
REPAIRS**



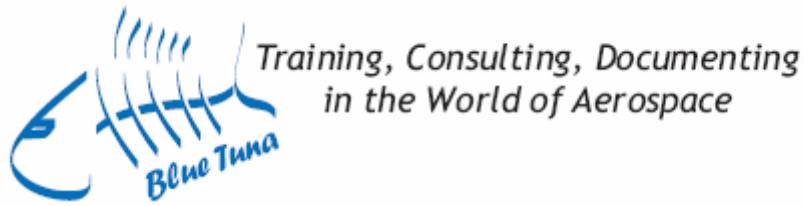
Major Repairs & Major Alterations



DEFINITION:

Field Approval:

ONE OF THE MEANS THE FAA USES TO APPROVE TECHNICAL DATA FOR MAJOR REPAIRS OR MAJOR ALTERATIONS. TECHNICAL DATA SO APPROVED BECOMES "TECHNICAL DATA APPROVED BY THE ADMINISTRATOR"



Major Repairs & Major Alterations



Field Approval Facts

- „ **Not found in the FARs**
- „ **Policy only**
- „ **FAA Airworthiness**
- Inspector sign Block 3 of**
FAA Form 337



Field Approval Facts

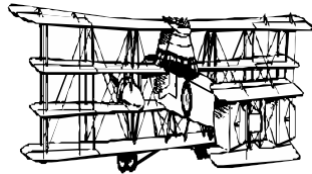
There are 2 kinds of field approvals:

- 1. Examination of Data only!**
“Approves” acceptable data
for major repairs/major
alterations.



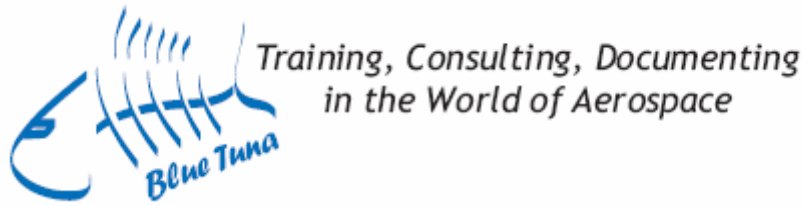
FIELD APPROVAL FACTS

**2. Physical inspection,
demonstration, or testing
of the repair or alteration.**



Notice

**You are not entitled to a
Field Approval even if the
Form 337 is "perfect."**



Major Repairs & Major Alterations



Why Not?

- 1. Field Approvals are policy only and are not regulatory.**
- 2. Authority to grant a field approval rests on the FAA A/W Inspector alone !**



Suggestion

If your field approval request has been denied try another inspector.

If it is denied twice--check your paper work.



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**A SUGGESTION TO IMPROVE YOUR
CHANCES OF GETTING A FIELD
APPROVAL.**

.. **IN APPENDIX A OF AC 43-210 IS AN
"OPTIONAL" FIELD APPROVAL
CHECKLIST AND DIRECTIONS.**

.. **IT CONTAINS JUST 12 ITEMS OR
MEMORY JOGGERS THAT WILL ENSURE
THAT THE REPAIR OR ALTERATION YOU
WANT TO PERFORM WILL BE DONE
RIGHT!**



Question ?

**What can not be
field approved?**



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TO FIND OUT CHECK FAA ORDER 8300.10 VOL 2 CHAPTER 2, FIG. 1-3 (Job aid)



.. **THIS ORDER IS ON THE FAA WEBSITE**

<http://www.faa.gov/avr/afs/faq/8300/>

- .. **Job aid addresses major alterations only and is divided into 5 categories:**
- .. **GA, Rotorcraft, Transport, Engines, Propellers and APU.**

CHANGES THAT AFFECT: CRASHWORTHINESS

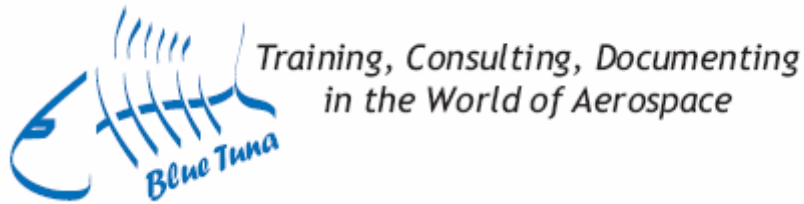


- .. **CHANGES TO TSO, ADs, ETOPs EQUIPMENT, OR PRESSURIZATION.**
- .. **ALTERATIONS TO PASSENGER CARRYING AIRCRAFT TO AN ALL-CARGO, OR COMBI CONFIGURATION.**

FIELD APPROVALS THAT REQUIRE FAA ENGINEERING INPUT:



- .. **SUBSTITUTION OF PARTS.**
- .. **CERAMIC COATINGS.**
- .. **WELDING OF PROPELLERS.**
- .. **ALTERNATIVE MEANS OF COMPLYING WITH AD.**
- .. **USE OF SYNTHETIC RESIN GLUES.**



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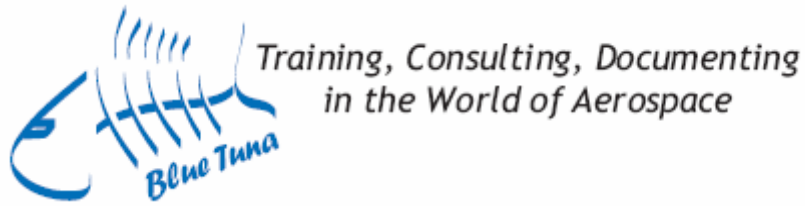
FIELD APPROVALS THAT REQUIRE FAA ENGINEERING INPUT:

- „ **NEW MAGNESIUM OR CHROME APPLICATIONS.**
- „ **NEW WELDING OR BRAZING PROCESSES.**
- „ **USE OF SYNTHETIC COVERINGS.**



FIELD APPROVALS THAT REQUIRE FAA ENGINEERING INPUT:

- „ **ANY CHANGE TO A REQUIRED AIRCRAFT INSTRUMENT SYSTEM NOT SPECIFICALLY AUTHORIZED BY A BULLETIN, FAA ORDER OR AN AC.**
- „ **INITIAL INSTALLATION OF A LITTER SYSTEM.**
- „ **CHANGES TO EMERGENCY EXITS.**
- „ **CHANGES TO THE TC PASSENGER SEATING CONFIGURATION.**



Major Repairs & Major Alterations

- 
- INCOMPLETE
INSTALLATIONS**
- „ **THE ALTERATION DATA HAS BEEN
FAA APPROVED.**

 - „ **THE INCOMPLETE INSTALLATION
WILL NOT AFFECT THE SAFE
OPERATION OF THE AIRCRAFT.**



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INCOMPLETE INSTALLATIONS

- „ **THE EQUIPMENT INSTALLED IS DEACTIVATED AND PLACARDED TO PREVENT USE.**
- „ **WEIGHT AND BALANCE RECORDS ARE CURRENT.**
- „ **MAINTENANCE RECORDS ENTRY MADE AND SIGNED OFF.**



INCOMPLETE INSTALLATION

- „ **OPERATOR IS ADVISED OF THE STATUS OF THE EQUIPMENT INSTALLED.**
- „ **WHEN THE INSTALLATION IS COMPLETED A CONFORMITY INSPECTION MAY BE REQUIRED.**



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FIELD APPROVAL FOR MAJOR ALTERATIONS

ADDITIONAL REQUIREMENTS

- „ **TECHNICIANS MUST SUBMIT INSTRUCTIONS FOR CONTINUED AIRWORTHINESS IN A MANUAL FORMAT.**
- „ **IN OTHER WORDS HOW ARE YOU GOING TO MAINTAIN THE ALTERATION FOR THE REST OF THE TIME IT IS ON THE AIRCRAFT.**

FIELD APPROVAL FOR MAJOR ALTERATIONS

- „ **THE FAA INSPECTOR “ACCEPTS” THE INSTRUCTIONS FOR CONTINUED AIRWORTHINESS ONLY.**
- „ **THE ICA’S SHOULD BE COMPLETE ENOUGH SO THE ALTERATIONS IS MAINTAINED IN AN AIRWORTHY CONDITION, THIS INCLUDES THE IDENTIFICATION OF REPLACEMENT OF PARTS.**



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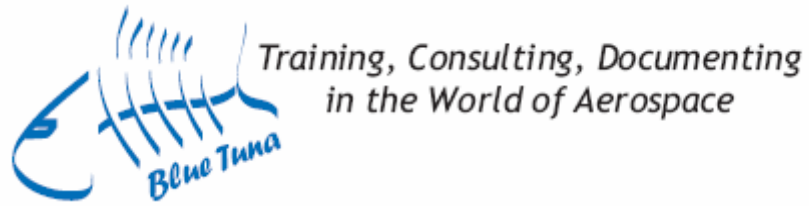
Summary:

- Major Repair --returns it to its original type design.
- „ Major Alteration--alters the type Design.
- „ Data is required.
- „ Acceptable / Approved Data.



Summary:

- „ **AC 43.13-1B “Approved Data”**
 - „ Appropriate to the product.
 - „ Applicable to the repair.
 - „ Not contrary to MFR.DATA.
 - „ Chapter/page/ paragraph.



Major Repairs & Major Alterations



SUMMARY:

„ **UNAPPROVED DATA.**

„ **S. T. C. PROCESS.**

„ **FIELD APPROVAL PROCESS.**