DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Aviation Rulemaking Advisory Committee Meeting

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of public meeting.

SUMMARY: This notice announces a public meeting of the FAA's Aviation Rulemaking Advisory Committee to discuss rotorcraft issues.

DATES: The meeting will be held on February 11, 2003, 3 p.m. CST.

ADDRESSES: The meeting will be held at the Dallas Convention Center, Room D–175, 650 S. Griffin Street, Dallas, TX 75202, telephone (214) 939–2700.

FOR FURTHER INFORMATION CONTACT: Caren Centorelli, Office of Rulemaking, ARM–200, FAA, 800 Independence Avenue, SW., Washington, DC 20591, telephone (202) 267–8199, e-mail *caren.centorelli@faa.gov.*

SUPPLEMENTARY INFORMATION: The referenced meeting is announced pursuant to Section 10(a)(2) of the Federal Advisory Committee Act (Pub. L. 92–463; 5 U.S.C. App. II).

The agenda will include:

- Discussion and approval of the Critical Parts proposed Advisory Circular material package.
- Working Group Status Reports.
- Fatigue Tolerance Evaluation of Metallic Structures.
- Damage Tolerence and Fatigue Evaluation of Composite Rotorcraft Structure.
- FAA Status Report.
- Performance and Handling Qualities Requirements Notice of Proposed Rulemaking.

Attendance is open to the interested public but will be limited to the space available. The FAA will arrange teleconference capability for individuals wishing to join in by teleconference if we receive that notification 10 calendar days before the meeting. Arrangements to participate by teleconference can be made by contacting the person listed in the **FOR FURTHER INFORMATION CONTACT** section. Callers outside the area will be responsible for paying long-distance charges.

The public must make arrangements to present oral statements at the meeting. Written statements may be presented to the committee at any time by providing 16 copies to the Assistant Chair or by providing the copies at the meeting.

If you are in need of assistance or require a reasonable accommodation for the meeting, please contact the person listed under the heading **FOR FURTHER INFORMATION CONTACT.** In addition, sign and oral interpretation, as well as a listening device, can be made available at the meeting if requested 10 calendar days before the meeting. Arrangements may be made by contacting the person listed under the heading **FOR FURTHER INFORMATION CONTACT.**

Issued in Washington, DC, on January 17, 2003.

Anthony F. Fazio,

Executive Director, Aviation Rulemaking Advisory Committee.

[FR Doc. 03–1596 Filed 1–23–03; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Aviation Rulemaking Advisory Committee Meeting on Transport Airplane and Engine Issues

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of public meeting.

SUMMARY: This notice announces a public meeting of the FAA's Aviation Rulemaking Advisory Committee (ARAC) to discuss transport airplane and engine (TAE) issues.

DATES: The meeting is scheduled for February 4–5, 2003, beginning at 9 am on February 4. Arrange for oral presentations by January 31.

ADDRESSES: The Boeing Company, 1200 Wilson Boulevard, Room 234, Arlington, VA.

FOR FURTHER INFORMATION CONTACT: Effie M. Upshaw, Office of Rulemaking, ARM–209, FAA, 800 Independence Avenue, SW., Washington, DC 20591, Telephone (202) 267–5075, or e-mail at *effie.upshaw@faa.gov.*

SUPPLEMENTARY INFORMATION: Pursuant to section 10(a)(2) of the Federal Advisory Committee Act (Pub. L. 92–463; 5 U.S.C. app. III), notice is given of an ARAC meeting to be held February 4–5 in Arlington, VA.

The agenda will include:

February 4

- Opening Remarks.
- FAA Report.
- Joint Aviation Authorities Report.
- Transport Canada Report.
- Executive Committee Report.
- Harmonization Management Team Report.
- ARAC Tasking Priorities and Cost-Benefit Analysis Methods Discussions.
- Engine Harmonization Working Group (HWG) Report and Approval.
- Loads and Dynamics HWG Report and Approval.
- Human Factors HWG Report.
- Mechanical Systems HWG Report.
- Ice Protection HWG Report.
- Design for Security HWG Report and Approval.

February 5

- General Structures HWG Report.
- Airworthiness Assurance Working Group Report.
- Powerplant Installations HWG Report.
- Written or verbal reports, as required, may be provided for the Continued Airworthiness Working Group and the following HWGs: Electromagnetic Effects, Flight Test, Avionics, Seat Test, Flight Control, Flight Guidance, System Design and Analysis, and Electrical Systems.

Three HWGs (Engine, Loads and Dynamics, and Design for Security) will be submitting final documents for approval:

1. The Engine HWG will seek approval of documents addressing engine critical parts integrity requirements;

2. The Loads and Dynamics HWG will seek approval of documents addressing ground load, landing loads conditions, and towing loads; and

3. The Design for Security HWG will seek approval of documents addressing aircraft features and protetions for the cabin, flight deck, and cargo compartments from the effects of an explosive device, including fire, smoke, and noxious vapors.

Attendance is open to the public, but will be limited to the availability of meeting room space and telephone lines. Visitor badges are required to gain entrance to the Boeing building where the meeting is being held. Please confirm your attention with the person listed in the **FOR FURTHER INFORMATION CONTACT** section no later than January 31. Please provide the following information: full legal name, country of citizenship, and name of your company, if applicable.

For those participating by telephone, the call-in number is (206) 655–0054, Passcode 923071#. Details are also available on the ARAC calendar at *http://www.faa.gov/avr/arm/araccal/htm.* To ensure that sufficient telephone lines are available, please notify the person listed in the **FOR FURTHER INFORMATION CONTACT** section of your intent by January 31. Callers outside the Washington metropolitan area will be responsible for paying long distance charges.

The public must make arrangements by January 31 to present oral statements

Rotorcraft Issues

Meeting Minutes

Date: February 11, 2003
Time: 3:00 p.m.
Place: Dallas Convention Center
Room D-175
Dallas, Texas

The Assistant Chair, Mr. John Swihart, called the meeting to order at 3:00 p.m. The attendees introduced themselves and signed the attendance sheet (Attachment 1 - PDF). Mr. Mark Schilling, Assistant Executive Director, read instructions governing the conduct of the meeting, and the agenda (Attachment 2 - PDF) was distributed. Mr. Swihart referenced that the agenda was published in the Federal Register on January 24, 2003, and then proceeded to give an overview of the meeting agenda.

Mr. Swihart discussed the July 18, 2002 RIG meeting. The meeting was called to discuss the two working group projects.

Status reports and working group presentations were made as described below:

Critical Parts:
Mr. Swihart distributed the revised Advisory Circular material for AC 27-1B and AC 29-2C regarding critical parts that was e-mailed to the RIG on January 15, 2003(Attachment 3 - PDF and Attachment 4 - PDF). He then discussed the changes and format. The paragraphs that were revised are 27.602, 29.547, 29.602 and 29.917.

Mr. Tom Sandberg (Sikorsky) discussed the AC and the history of the tasks for FAR/JAR 27/29. Mr. Sandberg explained that the ARAC Tasking Statement was published in the Federal Register on July 30, 2001. It was originally expected that rulemaking would be necessary; however, the working group was able to accomplish the tasks by revising the Advisory Circulars.

Mr. Sandberg also explained that JAA concerns were addressed, and FAA and JAA reached consensus on this Advisory Circular with no dissenting opinions. Mr. Sandberg proceeded to read the tasks from the July 30, 2001 Federal Register notice (66 FR 39387).

Mr. Swihart asked Mr. Sandberg if the tasks were addressed and if there were concerns. Mr. Sandberg said the tasks were addressed.Mr. Swihart then asked him if minimum compliance was achieved with minimum standards. Mr. Sandberg said yes.

Mr. Swihart asked if the changes in 27-1B and 27-2C were okay with the committee and clarified that there were no additional changes in the document that was e-mailed to the committee members prior to this meeting.

Mr. Bruno Moitre (JAA) asked Mr. Sandberg if all issues were addressed and he replied, yes.

All committee members present agreed by consensus that the AC was accepted. There was no disagreement. Mr. Swihart reported that Transport Canada gave their agreement via e-mail prior to the meeting. Mr. Swihart signed the package and gave a copy to the FAA.

Damage Tolerance and Fatigue Evaluation of Metallic Rotorcraft Structure: Mr. Larry Kelly (FAA) gave an overview for Ms. Sharon Miles (FAA) who was unable to attend the meeting. Mr. Kelly reviewed that ARAC agreed to forward the package to FAA for legal and economic review. The economist has had the package for one month.Combined legal and economic review will take approximately 90 days.The economist and FAA have had discussions to explain rotorcraft.There is no foreseen problem with the legal and economic review of the package.Hopefully legal and economic review will be completed by April 2003.Mr. Swihart and Mr. Kelly discussed what this review means. Mr. Kelly clarified that this is not the official review, it is being reviewed as a courtesy.

Damage Tolerance and Fatigue Evaluation of Composite Rotorcraft Structure:
Mr. Richard Monschke (FAA) gave an overview of what the working group (WG) has accomplished. He

reviewed the results of the RIG meeting held on July 18, 2002, verified that the proposed rules 27/29.573 were a minimum standard, verified that the preamble to the proposed rules was clear and straight forward, and alsostated that the WG consensus was 100% for both the proposed rules and the Advisory material.The RIG voted to send the proposed rules forward to the FAA for preliminary legal and economic review.

As of October 5, 2002, FAA had provided an economist and an attorney to give the document a preliminary review.

Mr. Monschke went on to explain that the FAA representative and the WG Co-Chairs have been actively working with the economist since mid-January. Composite Structure service history, production costs, and other questions have been discussed with the economist. The attorney has verified receipt of the package but has not worked on it yet.

Previously, some RIG members expressed concern over the differences between the new Fatigue Tolerance Evaluation of Metallic Structures rule and the new Damage Tolerance and Fatigue Evaluation of Composite Rotorcraft Structure rule. Mr. Monschke pointed out that the proposed rules were actually quite similar. Both rules address the following:

- Identification of Primary Structural Elements.
- In-flight measurement of loads.
- Loading spectra based on mission profile.
- A Residual Strength determination.
- Establishment of Inspections and Retirement times to avoid catastrophic failure.
- A Threat Assessment including but not limited to probable locations of damage, type of damage, and environmental effects.

Where the rules are different, the differences can be explained by the differences between metals and composites in material properties, material response to loads, failure modes, and response to the environment.

Mr. Monschke concluded by stating that the WG stands ready to assist the economist and the attorney in the preliminary review as required.

Mr. Mike Abdelmaseh (AIA/Kaman) asked about the status of the package. Mr. Monschke explained that FAA-ASW legal is actively reviewing the documents but planned to complete the review of the metallics package first.

<u>Performance and Handling Qualities Requirements:</u>
The group questioned why the process was taking so long. Ms. Caren Centorelli (FAA) and Mr. Lance Gant (FAA) explained that the regulatory evaluation needed to be revised. The FAA economist completed this revision in January 2003. The package is now being reviewed by FAA-ASW legal.

Mr. Gant asked if the NPA was pushed forward, Mr. Moitre was not certain if it had or not. Mr. Gant offered to call the JAA representative who was working on this project directly to find out the status. Group members expressed concerns that after all the work done to date the NPRM would not be harmonized due to the JAA transfer to EASA. Mr. Sandberg asked what it would take to get the JAA NPA released and continued to ask if it was possible to make this a priority. Mr. Sandberg also said that maybe FAA could help push the effort along since we've worked so hard to keep 27/29 harmonized. Mr. Kelly stated, as per the meeting in Italy in November 2002, it was agreed that the NPA would be sent. Mr. Gant again stated his intent to follow up with JAA on the NPA.

Other Business:
Mr. Moitregave an update on the EASA community. He clarified that JAA was not currently disbanded. JAA does not foresee a change in the working relationship with this group once the EASA transition is complete. They want to maintain harmonization with us.

Mr. Swihart made a presentation entitled "Building Better Rules, Three Reminders for Regulatory Clarity" (Attachment 5 -PDF). In his presentation, Mr. Swihart discussed the need for a better briefing for new ARAC working groups. He asked the RIG to please review the presentation and send feedback to him.

Mr. Sandberg and Mr.Wayne Barbini (Bell Helicopter) commented that this presentation should be part of the AC working group briefing and should be used as terms of reference for non-ARAC purposes as well. Mr. Moitre requested an electronic copy of the presentation.

Mr. Swihart explained that he prefers to schedule meetings on the day prior to the EXCOM meeting. Therefore, the next future meetings are as follows with the understanding that the meeting may be cancelled if there is nothing substantive to discuss or to approve.

May 14, 2003	TBD, Washington DC
August 13, 2003	TBD, Washington DC
November 12, 2003	TBD, Washington DC

Mr. Swihart reminded the committee that a notice would be published in the Federal Register at least 15 days prior to a RIG meeting. Mr. Swihart also reminded everyone that the meeting minutes would be available on the Office of Rulemaking's website.

The meeting adjourned at 4:05 p.m.

Attendance

Twenty-one people, including committee members, alternates, and government employees, attended the February 11, 2003, Aviation Rulemaking Advisory Committee meeting on Rotorcraft Issues. Four of the attendees participated via teleconferencing.

Public Notification

The Federal Register published an announcement of the meeting on January 24, 2003 (68 FR 3582).

Approval

I certify the above minutes are accurate.

/s/

Mr. John Swihart
Assistant Chair for ARAC Rotorcraft Issues Issued: March 31, 2003

Attachments

AVIATION RULEMAKING ADVISORY COMMITTEE
ROTORCRAFT ISSUES MEETING
DALLAS, TEXAS
FEBRUARY 11, 2003, 3:00 p.m. CST

Member (M) Non-member (NM)	Name	Affiliation	Telephone	Fax	E-mail
	Caren Centorelli	FAA	202-267-8199	202-267-5075	caren.centorelli@faa.gov
	John Swihart	HAI-ARAC	817-281-4169		jswihart@westok.net
	Mark Schilling	FAA	817-222-5110		Mark.R.Schilling@FAA.gov
NM	Wayne Barbin	Bell Helicopter	817 280-3783	-5655	WBARBIN1@BellHelicopter.Textron.com
M	Tom Sandberg	AIA/Sikorsky	203386-4471	-4703	TSANDBERG@SIKORSKY.COM
M	PG Colombo	AECMA	xx39-0331-229257	xx39-0331-711708	pg.colombo@agusta.it
NM	Larry M. Kelly	FAA	~~817-222-5110~~ 817 222-5111		Larry.M.Kelly@FAA.GOV
NM	Gifford A. Marr	HAI	817.232.2299	817 306 9592	GAMARR@CHARTER.NET
NM	H.G. Hartung	Timken Aerospace	817.220.2800	817.523.2819	hartungh@timken.com
NM	Gary Green	Columbia Helicopters	503-678-1222	503-678-1222	ggreen@columbiahelicopters.com
NM	Lance Gant	FAA	817-222-5114	817-222-5961	Lance.t.gant@faa.gov
NM	Michael Abdelmasih	AIA/Kaman	860 286-4188	860 243-7001	abdelmm-kac@kaman.com
M	Richard Monschke	FAA	817-222-5116	817-222-5961	Richard.A.Monschke@FAA.GOV
NM	Bill Taylor	Transport Canada	613-952-4366		Taylorw@tc.gc.ca
M	Chris Leonard	ISAMP	610-399-1744	610-399-1660	cleonard@keystonehelicopter.com

	M	Bruno MOITRE	ENAC - JAA	+39081787153	+~~39081787~~	b.moitre@enac.rupa.it
	NM	Catherine GATHIER	AECMA - Eurocopter	+33442856468	+33442858674	catherine.gathier@eurocopter.com
*call-in	NM	Steve Grieme	Air Group America	724-779-9500	-9510	airgroup@zcominternet.com
*call-in	NM	Pete Hardy	Timkin Aero.	603-443-8942	-8910	hardyp@timken.com
*call-in	NM	Roger Carlin	MD Helicopters	480-346-6231	-6810	roger.carlin@mdhelicopters.com
*call-in	NM	~~Jon~~ Jon Roesch	MD Helicopters	"	"	jon.roesch@mdhelicopters.com

Building Better Rules

Three Reminders for Regulatory Clarity

John Swihart

Helicopter Association International

4/3/2003 1

Topics Covered

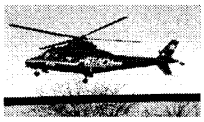
- Minimum Standards
- Advisory Circulars (ACs)
- Preambles

4/3/2003 2

- First reminder:

Regulate to ensure a

Minimum Level of Safety



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Minimum Standards in Federal Statutes (49 USC § 44701)

(a) Promoting Safety.--The Administrator of the Federal Aviation Administration shall promote safe flight of civil aircraft in air commerce by prescribing—

(1) **minimum standards** required in the interest of safety for appliances and for the design, material, construction, quality of work, and performance of aircraft, aircraft engines, and propellers;"

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- Second reminder:

Advisory Circulars are NOT Rules

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FAA Order 1320.46C on Acs

(Chapter 1, par. 3(a))

The AC system:

(a) Provides guidance such as methods, procedures, and practices acceptable to the Administrator for complying with regulations and grant requirements. ACs may also contain explanations of regulations, other guidance material, best practices, or other information useful to the aviation community. **They do not create or change a regulatory requirement.**

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More on ACs:
(FAA Order 1320.46C, chapter 3, par. 4)

4. General requirements an AC.

Follow these principles in writing an AC.

(c) **Your AC may not include any material that imposes reduces, or changes a regulatory burden on anyone.**

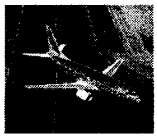
Still more on ACs:
(FAA Order 1320.46C, chapter 3, par. 9)

Presenting regulatory material in an AC.

You may not use an AC to add, reduce, or change a regulatory requirement. However, since many ACs provide guidance material relating to regulations, you may need to talk about regulations in your AC.

◆Third Reminder:

Document your Intent in



The Preamble

Preamble Defined
(Federal Register Document Drafting Handbook, 2.5)

Each agency document published in the rules category of the Federal Register must contain a preamble. . . It **explains the basis and purpose of the regulatory text**, but contains no regulatory text. **It arranges basic information on the "who, what, where, when, and why" of a document for the reader's convenience.**

Sections of the Preamble

- Agency:
- Action:
- Summary:
- Dates:
- Addresses:
- For further information contact:
- Supplementary information:

Summary
(Federal Register Document Drafting Handbook, 2.5)

- Use language a non-expert will understand.
- Describe what the document does, not how it affects the CFR.
- State what your document does; do not include regulatory history or extensive background.
- Be brief.

Supplementary Information
(Federal Register Document Drafting Handbook, 2.5)

In this section, include the regulatory history of this rulemaking, and a statement of the rule's basis and purpose. Present this information in language that the reader can easily understand, with descriptive headings to highlight and organize topics.

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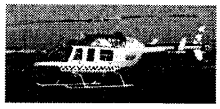
Preamble

- **Summary**
- **Supplementary Information**



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Summary

- One: Minimum Standards
- Two: ACs are not regulations
- Three: Document regulatory intent in the Preamble

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AC 29.547A. § 29.547 (Amendment 29-40) MAIN ROTOR AND TAIL ROTOR STRUCTURE.
~~STRUCTURE.~~

a. Explanation. Amendment 29-40 revised § 29.547 to add requirements to perform a design assessment. ~~FAR 29.547~~Section 29.547 (a) and (b) set forth a definition of a rotor and its associated components and requires a design assessment to be performed. The intent of these paragraphs is to identify the critical components and/or clarify their design integrity to show that the basic airworthiness requirements which are applicable to the rotors will be met.

A design assessment of the rotors should be carried out in order to substantiate that they are of a safe design and that compensating provisions are made available to prevent failures classified as hazardous and catastrophic in the sense specified in paragraph b below. In carrying out the design assessment, the results of the certification ground and flight testing (including any failures or degradation) should be taken into consideration. Previous service experience with similar designs should also be taken into account (see also ~~FAR 29.601(a)).~~ § 29.601(a)).

b. Definitions. For the purposes of this assessment, failure conditions may be classified according to the severity of their effects as follows:

(1) Minor. Failure conditions which would not significantly reduce rotorcraft safety, and which involve crew actions that are well within the crew capabilities. Minor failure conditions may include, for example, a slight reduction in safety margins or functional capabilities, a slight increase in crew workload, such as routine flight plan changes, or some inconvenience to occupants.

(2) Major. Failure conditions which would reduce the capability of the rotorcraft or the ability of the crew to cope with adverse operating conditions to the extent that there would be, for example, a significant reduction in safety margins or functional capabilities, a significant increase in crew work load or in conditions impairing crew efficiency, or discomfort to occupants, possibly including injuries.

(3) Hazardous. Failure conditions which would reduce the capability of the rotorcraft or the ability of the crew to cope with adverse operating conditions to the extent that there would be --

(i) A large reduction in safety margins or functional capabilities.

(ii) Physical distress or higher workload such that the flight crew cannot be relied upon to perform their tasks accurately or completely.

(iii) Serious or fatal injury to a relatively small number of the occupants.

(iv) Loss of ability to continue safe flight to a suitable landing site.

(4) Catastrophic. Failure conditions which would prevent a safe landing.

(5) Minimize. Reduce to the least possible amount by means that can be shown to be both technically feasible and economically justifiable.

(6) Health Monitoring. Equipment, techniques, and/or procedures by which selected incipient failure or degradation can be determined.

c. Procedures.

(1) Failure Analysis. The first stage of the design assessment should be the failure analysis, by which all the hazardous and catastrophic failure modes are identified. The failure analysis may consist of a structured, inductive bottom-up analysis, which is used to evaluate the effects of failures on the system and on the aircraft for each possible item or component failure. When properly formatted, it will aid in identifying latent failures and the possible causes of each failure mode. The failure analysis should take into consideration all reasonably conceivable failure modes in accordance with the following:

(i) Each item/component function(s).

(ii) Item/component failure modes and their causes.

(iii) The most critical operational phase/mode associated with the failure mode.

(iv) The effects of the failure mode on the item/component under analysis, the secondary effects on the rotors and on the rotor drive system, on other systems, and on the rotorcraft. Combined effects of failures should be analyzed where a primary failure is likely to result in a secondary failure.

(v) The safety device or health monitoring means by which occurring or incipient failure modes are detected, or their effects mitigated. The analysis should consider the safety system failure.

(vi) The compensating provision(s) made available to circumvent or mitigate the effects of the failure mode (see also paragraph c(2) below)

(vii) The failure condition severity classification according to the definitions given in ~~(b)~~paragraph b above.

When deemed necessary for particular system failures of interest, the above analysis may be supplemented by a structured, deductive top-down analysis, which is used to determine which failure modes contribute to the system failure of interest.

Dormant failure modes should be analyzed in conjunction with at least one other failure mode for the specific component or an interfacing component. This latter failure mode should be selected to represent a failure combination with potential worst case consequences.

When significant doubt exists as to the effects of a failure, these effects may be required to be verified by tests.

(2) Evaluation of Hazardous and Catastrophic Failures: The second stage of the design assessment is to summarize the hazardous and catastrophic failures and appropriately substantiate the compensating provisions which are made available to minimize the likelihood of their occurrence. Those failure conditions that are more severe should have a lower likelihood of occurrence associated with them than those that are less severe. The applicant should obtain early concurrence of the cognizant certificating authority with the compensating provisions for each hazardous or catastrophic failure.

Compensating provisions may be selected from one or more of those listed below, but not necessarily limited to this list.

(i) Design features; i.e., safety factors, part derating criteria, redundancies, etc.

(ii) A high level of ~~integrity.~~
integrity: All parts with catastrophic failure modes and critical characteristics are to be identified as Critical Parts and be subject to a Critical Parts Plan (see AC 29.602). Where a high level of integrity is used as a compensating provision, parts with a hazardous failure mode which would prevent continued safe flight may be included in a Critical Parts Plan or subjected to other enhancements to the normal control procedures for parts.

(iii) Fatigue tolerance evaluation.

(iv) Flight limitations.

(v) Emergency procedures.

(vi) An inspection or check that would detect the failure mode or evidence of conditions that could cause the failure mode.

(vii) A preventive maintenance action to minimize the likelihood of occurrence of the failure mode including replacement actions and verification of serviceability of items which may be subject to a dormant failure mode.

(viii) Special assembly procedures or functional tests for the avoidance of assembly errors which could be safety critical.

(ix) Safety devices or health monitoring means beyond those identified in (vi) and (vii) above.

AC 29.602 § 29.602 CRITICAL PARTS.

a. Explanation.

(1) Critical parts requirements apply to structural components, rotor drive systems, rotors, and mechanical control systems.

~~a. Explanation. The~~ (2) The objective of identifying critical parts is to ensure that critical parts are controlled during design, manufacture, and throughout their service life so that the risk of failure in service is minimized by ensuring that the critical parts maintain the critical characteristics on which certification is based.

(3) Definitions with respect to § 29.602:

(i) The use of the word "could" in paragraph 29.602(a) of the rule means that this failure assessment should consider the effect of flight regime (i.e., forward flight, hover, etc.). The operational environment need not be considered.

(ii) With respect to this rule, the term "catastrophic" means the inability to conduct an autorotation to a safe landing, without exceptional piloting skills, assuming a suitable landing surface is available.

(iii) The use of the word "and" in paragraph 29.602(a) of the rule means the part must have both a catastrophic failure mode together with one or more critical characteristics.

(iv) With respect to this rule, the term "part" means one piece, or two or more pieces permanently joined together.

(v) With respect to this rule, the term "critical characteristic" means any dimension, tolerance, finish, material, or any manufacturing or inspection process, or other feature which cannot tolerate variation from type design requirements and, if nonconforming, would cause failure of the critical part.

~~based. Many~~ (4) Many rotorcraft manufacturers already have procedures in place within their companies for handling "critical ~~parts".~~parts." These plans may be required by their dealings with other customers, frequently military (e.g., US DoD, UK MoD, Italian MoD). Although these ~~programs~~plans may have slightly different definitions of "critical parts" ~~and~~which have sometimes been called "Flight Safety ~~Parts", "Critical Parts", "Vital Parts",~~Parts," "Critical Parts," "Vital Parts," or "Identifiable ~~Parts",~~Parts," they have in the past been accepted as meeting the intent of this requirement and providing the expected level of ~~safety.~~ safety. It is acceptable for these plans to use alternative names and terminology provided they meet the intent of this requirement.

b. Procedures. The rotorcraft manufacturer should establish a Critical Parts ~~Plan.~~Plan that identifies and controls the critical characteristics. The policies and

procedures which constitute that plan should be such as to ensure that--

(1) All critical parts of the rotorcraft are identified by means of an appropriate failure assessment and a Critical Parts List is ~~established. The use of the word "could" in paragraph 29.602(a) of the rule means that this failure assessment should consider the effect of flight regime (i.e., forward flight, hover,~~ established. ~~etc.). The operational environment need not be considered. With respect to this rule, the term "catastrophic" means the inability to conduct an autorotation to a safe landing, without exceptional piloting skills, assuming a suitable landing surface.~~

(2) Documentation draws the attention of the personnel involved in the design, manufacture, maintenance, inspection, and overhaul of a critical part to the special nature of the part and details the relevant special instructions. For example all drawings, work sheets, inspection documents, etc., could be prominently annotated with the words "Critical Part" or equivalent and the Instructions for Continued Airworthiness and Overhaul Manuals (if applicable) should clearly identify critical parts and include the needed maintenance and overhaul instructions. The documentation should:

(i) Contain comprehensive instructions for the maintenance, inspection and overhaul of critical parts and emphasize the importance of these special procedures;

(ii) Indicate to operators and overhaulers that unauthorized repairs or modifications to critical parts may have hazardous consequences;

(iii) Emphasize the need for careful handling and protection against damage or corrosion during maintenance, overhaul, storage, and transportation and accurate recording and control of service life (if ~~applicable).~~applicable);

(iv) Require notification of the manufacturer of any unusual wear or deterioration of critical parts and the return of affected parts for investigation when appropriate;

(3) Procedures should be established for identifying and controlling critical characteristics.

~~(3)~~(4) To the extent needed for control of critical characteristics, procedures and processes for manufacturing critical parts (including test articles) are defined (for example material source, forging procedures, machining operations and sequence, inspection techniques, and acceptance and rejection criteria). Procedures for changing these manufacturing procedures should also be established.

~~(4)~~(5) Any changes to the manufacturing procedures, to the design of a critical part, to the approved operating environment, or to the design loading spectrum are evaluated to establish the effects, if any, on the fatigue evaluation of the part.

~~(5)~~(6) Materials review procedures for critical parts (i.e., procedures for determining the disposition of parts having manufacturing errors or material flaws) are in accordance with paragraphs ~~(3) and (4)~~(4) and (5) above.

~~(6)~~(7) Critical parts are identified as required, and relevant records relating to the identification are maintained such that it is possible to establish the manufacturing history of the individual parts or batches of parts.

~~(7)~~(8) The critical characteristics of critical parts produced in whole or in part by suppliers are maintained.

AC 29.917A. § 29.917 (Amendment 29-40) DESIGN.

a. Explanation. Amendment 29-40 introduces a new § 29.917(b). The previous § 29.917(b) has been redesignated as § 29.917(c). ~~FAR 29.917(a)~~Section 29.917(a) sets forth a definition of the rotor drive system and its associated components and ~~FAR 29.917(b)~~§ 29.917(b) requires a design assessment to be performed. The intent of this paragraph (b) is to identify the critical components and to establish and/or clarify their design integrity to show that the basic airworthiness requirements, which are applicable to the rotor drive system, will be met.

b. Procedures.

(1) Section 29.917(a) General. The method of compliance for this section is unchanged.

(2) Section 29.917(b) Design Assessment. A design assessment of the rotor drive system should be carried out in order to substantiate that the system is of a safe design and that compensating provisions are made available to prevent failures classified as hazardous and catastrophic in the sense specified in paragraph (c) below. In carrying out the design assessment, the results of the certification ground and flight testing (including any failures or degradation) should be taken into consideration. Previous service experience with similar designs should also be taken into account (see also ~~FAR 29.601(a)).~~§ 29.601(a)).

c. Definitions. For the purposes of this assessment, failure conditions may be classified according to the severity of their effects as follows:

(1) Minor. Failure conditions which would not significantly reduce rotorcraft safety, and which involve crew actions that are well within their capabilities. Minor failure conditions may include, for example, a slight reduction in safety margins or functional capabilities, a slight increase in crew workload, such as routine flight plan changes, or some inconvenience to occupants.

(2) Major. Failure conditions which would reduce the capability of the rotorcraft or the ability of the crew to cope with adverse operating conditions to the extent that there would be, for example, a significant reduction in safety margins or functional capabilities, a significant increase in crew workload or in conditions impairing crew efficiency, or discomfort to occupants, possibly including injuries.

(3) Hazardous. Failure conditions which would reduce the capability of the rotorcraft or the ability of the crew to cope with adverse operating conditions to the extent that there would ~~be~~ be--

(i) A large reduction in safety margins or functional capabilities;

(ii) Physical distress or higher workload such that the flight crew cannot be relied upon to perform their tasks accurately or completely;

(iii) Serious or fatal injury to a relatively small number of the occupants;

(iv) Loss of ability to continue safe flight to a suitable landing site.

(4) Catastrophic. Failure conditions which would prevent a safe landing.

(5) Minimize. Reduce to the least possible amount by means that can be shown to be both technically feasible and economically justifiable.

(6) Health Monitoring. Equipment, techniques, and/or procedures by which selected incipient failure or degradation can be determined.

d. Failure Analysis.

(1) The first stage of the design assessment should be the Failure Analysis, by which all the hazardous and catastrophic failure modes are identified. The failure analysis may consist of a structured, inductive bottom-up analysis, which is used to evaluate the effects of failures on the system and on the aircraft for each possible item or component failure. When properly formatted it will aid in identifying latent failures and the possible causes of each failure mode. The failure analysis should take into consideration all reasonably conceivable failure modes in accordance with the following:

(i) Each item/component function(s).

(ii) Item/component failure modes and their causes.

(iii) The most critical operational phase/mode associated with the failure mode.

(iv) The effects of the failure mode on the item/component under analysis, the secondary effects on the rotor drive system and on the rotors, on other systems and on the rotorcraft. Combined effects of failures should be analyzed where a primary failure is likely to result in a secondary failure.

(v) The safety device or health monitoring means by which occurring or incipient failure modes are detected, or their effects mitigated. The analysis should consider the safety system failure.

(vi) The compensating provision(s) made available to circumvent or mitigate the effect of the failure mode (see also paragraph (1) below).

(vii) The failure condition severity classification according to the definitions given in paragraph (c) above.

(2) When deemed necessary for particular system failures of interest, the above analysis may be supplemented by a structured, deductive top-down analysis, which is used to determine which failure modes contribute to the system failure of interest.

(3) Dormant failure modes should be analyzed in conjunction with at least one other failure mode for the specific component or an interfacing component. This latter failure mode should be selected to represent a failure combination with potential ~~worst case~~worst-case consequences.

(4) When significant doubt exists as to the effects of a failure, these effects may be required to be verified by tests.

e. Evaluation of Hazardous and Catastrophic Failures.

(1) The second stage of the design assessment is to summarize the hazardous and catastrophic failures and appropriately substantiate the compensating provisions ~~which~~that are made available to minimize the likelihood of their occurrence. Those failure conditions that are more severe should have a lower likelihood of occurrence associated with them than those that are less severe. The applicant should obtain early concurrence of the cognizant certificating authority with the compensating provisions for each hazardous or catastrophic failure.

(2) Compensating provisions may be selected from one or more of those listed below, but not necessarily limited to this list.

(i) Design features; i.e., safety factors, part-derating criteria, redundancies, etc.

(ii) A high level of ~~integrity.~~
integrity: All parts with catastrophic failure modes and critical characteristics are to be identified as Critical Parts and be subject to a Critical Parts Plan (see AC 29.602.). Where a high level of integrity is used as a compensating provision, parts with a hazardous failure mode which would prevent continued safe flight may be included in a Critical Parts Plan or subjected to other enhancements to the normal control procedures for parts.

(iii) Fatigue tolerance evaluation.

(iv) Flight limitations.

(v) Emergency procedures.

(vi) An inspection or check that would detect the failure mode or evidence of conditions that could cause the failure mode.

(vii) A preventive maintenance action to minimize the likelihood of occurrence of the failure mode, including replacement actions and verification of serviceability of items which may be subject to a dormant failure mode.

(viii) Special assembly procedures or functional tests for the avoidance of assembly errors which could be safety critical.

(ix) Safety devices or health monitoring means beyond those identified in paragraphs (vi) and (vii) above.

AC 27.602 § 27.602 CRITICAL PARTS.

a. Explanation.

(1) Critical parts requirements apply to structural components, rotor drive systems, rotors, and mechanical control systems.

~~a. Explanation. The~~ (2) The objective of identifying critical parts is to ensure that critical parts are controlled during design, manufacture, and throughout their service life so that the risk of failure in service is minimized by ensuring that the critical parts maintain the critical characteristics on which certification is based.

(3) Definitions with respect to § 27.602:

(i) The use of the word "could" in paragraph 27.602(a) of the rule means that this failure assessment should consider the effect of flight regime (i.e., forward flight, hover, etc.). The operational environment need not be considered.

(ii) With respect to this rule, the term "catastrophic" means the inability to conduct an autorotation to a safe landing, without exceptional piloting skills, assuming a suitable landing surface is available.

(iii) The use of the word "and" in paragraph 27.602(a) of the rule means the part must have both a catastrophic failure mode together with one or more critical characteristics.

(iv) With respect to this rule, the term "part" means one piece, or two or more pieces permanently joined together.

(v) With respect to this rule, the term "critical characteristic" means any dimension, tolerance, finish, material, or any manufacturing or inspection process, or other feature which cannot tolerate variation from type design requirements and, if nonconforming, would cause failure of the critical part.

~~based. Many~~ (4) Many rotorcraft manufacturers already have procedures in place within their companies for handling "critical ~~parts".~~parts." These plans may be required by their dealings with other customers, frequently military (e.g., US DoD, UK MoD, Italian MoD). Although these ~~programs~~plans may have slightly different definitions of "critical parts" ~~and~~which have sometimes been called "Flight Safety ~~Parts",~~ ~~"Critical Parts", "Vital Parts",~~Parts," "Critical Parts," "Vital Parts," or "Identifiable ~~Parts",~~Parts," they have in the past been accepted as meeting the intent of this requirement and providing the expected level of ~~safety.~~
safety. It is acceptable for these plans to use alternative names and terminology provided they meet the intent of this requirement.

b. Procedures. The rotorcraft manufacturer should establish a Critical Parts ~~Plan.~~Plan, which identifies and controls the critical characteristics. The policies and

procedures which constitute that plan should be such as to ensure that--

(1) All critical parts of the rotorcraft are identified by means of an appropriate failure assessment and a Critical Parts List is ~~established. The use of the word "could" in paragraph 29.602(a) of the rule means that this failure assessment should consider the effect of flight regime (i.e., forward flight, hover,~~ established. ~~etc.). The operational environment need not be considered. With respect to this rule, the term "catastrophic" means the inability to conduct an autorotation to a safe landing, without exceptional piloting skills, assuming a suitable landing surface.~~

(2) Documentation draws the attention of the personnel involved in the design, manufacture, maintenance, inspection, and overhaul of a critical part to the special nature of the part and details the relevant special instructions. For example all drawings, work sheets, inspection documents, etc., could be prominently annotated with the words "Critical Part" or equivalent and the Instructions for Continued Airworthiness and Overhaul Manuals (if applicable) should clearly identify critical parts and include the needed maintenance and overhaul instructions. The documentation should:

(i) Contain comprehensive instructions for the maintenance, inspection and overhaul of critical parts and emphasize the importance of these special procedures;

(ii) Indicate to operators and overhaulers that unauthorized repairs or modifications to critical parts may have hazardous consequences;

(iii) Emphasize the need for careful handling and protection against damage or corrosion during maintenance, overhaul, storage, and transportation and accurate recording and control of service life (if ~~applicable).~~applicable);

(iv) Require notification of the manufacturer of any unusual wear or deterioration of critical parts and the return of affected parts for investigation when appropriate;

(3) Procedures should be established for identifying and controlling critical characteristics.

~~(3)~~(4) To the extent needed for control of critical characteristics, procedures and processes for manufacturing critical parts (including test articles) are defined (for example material source, forging procedures, machining operations and sequence, inspection techniques, and acceptance and rejection criteria). Procedures for changing these manufacturing procedures should also be established.

~~(4)~~(5) Any changes to the manufacturing procedures, to the design of a critical part, to the approved operating environment, or to the design loading spectrum are evaluated to establish the effects, if any, on the fatigue evaluation of the part.

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AGENDA

ARAC RIG Meeting
Dallas Convention Center
Room D-175
650 S. Griffin Street
Dallas, TX 75202
(214) 939-2700
February 11, 2003, 3:00 p.m. - 5:00 p.m.

Call to Order	**Mr. John Swihart**
Self Introduction	**All Present**
Administrative Guidance	**Mr. Mark Schilling**
Remarks by ARAC Chair	**Mr. John Swihart**
Discussion and approval of the Critical Parts proposed Advisory Circular material package.	**Mr. Tom Sandberg**
Working Group Status Reports:	
Fatigue Tolerance Evaluation of Metallic Structures	**Mr. Larry Kelly**
Damage Tolerence and Fatigue Evaluation of Composite Rotorcraft Structure	**Mr. Richard Monschke**
FAA Status Report:	
Performance and Handling Qualities Requirements NPRM	**Ms. Caren Centorelli**
Other Business	**Mr. John Swihart**
Future Meetings	**Mr. John Swihart**
Adjourn	**Mr. John Swihart**

Minutes of this meeting will be available on the FAA web site at http://www.faa.gov/avr/arm/aracmin.htm