

THE FAA DESIGNEE SYSTEM AND ITS CONTRIBUTION  
TO COMMERCIAL AVIATION.

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To be presented at the 16th Congress of the International Council of Aeronautical Sciences, Jerusalem, on August 28-Sept.2 1988

Abstract

The existence, purpose and functions of the U.S. Federal Aviation Administration (FAA) and its predecessor agencies are believed to be well known in the commercial aviation community and to the public. Probably far less familiar is a broad system of authority delegated by the FAA to private persons, and the impact of the system on commercial aviation. This paper addresses the origin, need, functions and effects of the FAA designee system. Also described are the benefits to the FAA, the aviation community and the public. The authority of public law, the governing regulations and the currently permitted and operative areas of designations are described. The law permits appointments of designees in a wide range of specialties including engineering design, test, piloting, quality control, aircraft maintenance and operation, and medical certification. Engineering specialties include delegation in the fields of flight test, aircraft structures, systems and power plants. Details pertaining to the specific class of designees - "Designated Engineering Representative" (DER) are presented. The roles of the FAA-DER in the civil aircraft certification process and in support of transport category airplane operation and maintenance are discussed. Limitations of a DER's authority, responsibilities and scope of work are addressed. A discussion is given of the checks and balances incorporated within the system, necessary to assure that the regulatory authority (FAA) retains control of the certification process. This includes the need to maintain a high level of safety and a uniform standard of administration. It is hoped that this presentation and the views of the authors may be helpful to other authorities who may be considering the implementation of a designee system in the future.

Introduction

1988 marks the 50th year since a very limited delegation of official civil aviation services began in the United States. That small beginning in the year 1939, shortly after the establishment of the U.S. Civil Aeronautics Authority (CAA), permitted certificated aircraft repaired by an "approved airman" to fly for 30 days while awaiting arrival of a FAA inspector !

Previously, an acute shortage of CAA inspectors frequently caused long delays before a serviced airplane could be returned to active flight status. In the following decades, especially after World War II, the demand for government aviation services mandated by law continued to surpass by far the Congressional funding for those services. Thus, through enactment of two far-reaching aviation laws - the Civil Aeronautics Act and the Federal Aviation Act - and numerous administrative reorganizations, did regulatory activities performed by private citizens expand as it became both economically and technologically necessary. Currently there are hundreds of engineers and pilots in the United States designated as "Representatives of the Administrator".

Definition

A Designated Representative of the (FAA) Administrator, or "Designee", for the purposes of this discussion, is a private person who has been appointed to act in behalf of the (FAA) Administrator in a designated area of responsibility. Such areas are the examination, inspection and testing of aircraft, equipment and persons for the purpose of issuing airman and aircraft certificates.

The Federal Aviation Regulations, Part 183 (FAR 183), specify the privileges of such representatives, and prescribe rules for exercising those privileges. It is noted that such representational designation implies only a specific limited delegation; the final certification authority remaining with the FAA Administrator. The FAA holds that a designee is not an employee of the Federal Aviation Administration or of the United States Government. He may therefore be personally liable for any actions taken pursuant to his appointment.

## Evolution of the System

The Civil Aeronautics Authority, which in 1938 superseded the Bureau of Air Commerce of the U.S. Department of Commerce (BAC), faced the challenge to build public confidence in civil aviation as a safe and reliable mode of transportation, and to foster the industry's development and economic health. The BAC had issued the first "Airworthiness Requirements for Aircraft" as part of the Air Commerce Regulations. The objectives contained therein stand to-day, having been carried through subsequent reorganizations into the Civil Aeronautics Administration (CAA), the Federal Aviation Agency, and the present Federal Aviation Administration of the Department of Transportation (DOT). Today, the FAA derives its authority from the Federal Aviation Act of 1958 with amendments as enacted by the Congress of the United States.

The stated purpose of the Federal Aviation Act (1958) is "...to create a Federal Aviation agency, to provide for the regulation and promotion of civil aviation in such a manner as to best foster its development and safety, and to provide for the safe and efficient use of the airspace by both civil and military aircraft, and for other purposes."

In 1942, a separate, independent regulatory body called the Civil Aeronautics Board issued the Civil Air Regulations (CAR), including CAR Part 4 - the airplane airworthiness section applicable to transport category type certification. The final version, CAR 4b was recodified in 1965 to become the present Federal Aviation Regulation (FAR), Part 25 applicable to transport airplane certification in the United States. Other parts of the code apply to certification of "small" airplanes (Part 23), aircraft engines (Part 33), rotorcraft (Parts 27 and 29), Balloons, etc.

The Federal Aviation Act of 1958 defines the "Powers of the Administrator", including his right to delegate certain powers to other FAA employees. The Act also includes Section 314 - "Delegation of Powers and Duties to Private Persons" - forming the legal basis for the present FAA designee system. It allows delegation of the following functions to "... properly qualified private persons:

The examination, inspection and testing necessary to the issuance of certificates...

The issuance of such certificates in accordance with standards established by (the Administrator)..."

## Designated Representatives of the (FAA) Administrator

The (legislative) authority for delegating to private persons the limited certification powers described above is implemented in Part 183 of the Federal Aviation Regulations "Representatives of the Administrator". It specifies the appointments made by the FAA, their duration, the appointing authorities, and criteria used in making such appointments.

At present, the following designations are in effect:

FAR 183.21 Aviation Medical Examiners

FAR 183.23 Pilot Examiners

FAR 183.25 Technical Personnel Examiners

FAR 183.27 Designated Aircraft Maintenance Inspectors

FAR 183.29 Designated Engineering Representatives

FAR 183.31 Designated Manufacturing Inspection Representatives

Generally the objectives of the FAA in making these appointments are twofold:

(1) to relieve the limited number of specialists available within the FAA from their substantial and excessive workload, and

(2) to make available to the aviation community, and to the public, a timely, professional service at an economic cost.

Left to authorized resources, the FAA would be unable to accommodate all required examinations, tests, analyses and other tasks without major increases in budget and staffing - or without incurring substantial delays.

As an example, let us look at FAA medical examination and certification: FAA medical certificates have expiration dates of 24 months (for private pilots) to 6 months for transport category (airline) pilots (ATR). If these pilots could not get timely medical reexaminations, their certificates would expire and they are in effect grounded. Clearly, this would be economically unacceptable. With the availability of FAA designated Airman Medical Examiners (AME) augmenting the FAA Medical staff, pilots are able to undergo timely medical re-examinations. The potential "groundings" are eliminated, except for cause.

In general, the same underlying issues of large and increasing workloads apply

to all other FAA designee categories - especially that of the Designated Engineering Representative (DER).

Let us now examine the types and roles of DERs supporting the FAA and how they function in practice.

### The Designated Engineering Representative (DER)

During the first half of this century in the United States, when the design and fabrication of aircraft were evolving from garage-shops to an infant industry, United States government oversight was minimal - with the center of interest focused on potential military applications.

The Bureau of Air Commerce was, in some respects, an observer to the involvement of the Department of the Army in fostering airplane design. As the commercial potential for aeronautics was recognized, the U.S. Congress enacted legislation to form the Civil Aeronautics Administration, and thereafter, the Federal Aviation Agency - responsible directly to the President. Rudimentary laws were made, along with implementing "regulations", to assure the orderly development and control of the young aviation industry. Only a few government administrators and engineers were necessary to fulfill the regulatory intent of the Congress.

The rest is history. Each succeeding decade was to produce such dynamic growth in aircraft technology and construction that it became economically (and politically) impractical for the U.S. government to both regulate and oversee, in minute detail, every aspect of the burgeoning air transport industry. Thus, the idea of delegation to "the private sector" was born.

Figure 1. Chart A1., from Appendix 2 to the FAA DER Guidance Handbook (FAA Order 8110.37) shows the delegated functions and authorized areas for "Structural" DERs. Aircraft structures is one of the nine major engineering sub-areas in which designees may be appointed. The others are Powerplant, Systems & Equipment, Radio, Engine, Propeller, Flight Analyst, Flight Test Pilot and Acoustics.

These categories are further divided into specialities as typified by Figure 1. Chart A1. of the above. (see Appendix I. hereto).

This Figure displays general examples of regulation compliance which designees may approve within their authorized areas - and other matters which must be referred to the FAA for approval. The

chart covers such basic examples for the Systems & Equipment, Radio, and Engine categories of DER. These limitations on authority are closely controlled by the FAA, are specific for each individual appointment, and at any time may be modified, augmented, or revoked at the discretion of the appointing office. In rare cases, an engineer may be cross-designated; that is, authorized to exercise approval privileges in more than one engineering specialty or technology field. Like the airworthiness regulations themselves, the specialization of DER functions and authority changes as aircraft technology evolves.

### DER Duties and Responsibilities

The duties and responsibilities of FAA DERs are now quite extensive and detailed. Limits of authority may vary from one engineering specialty to another, and from year to year in any specialty. The most detailed description of DER procedures, duties and responsibilities is provided in Chapter 5 of FAA Handbook (Order) 8110.4 - Type Certification. The scope of activity and authority limits are generally based on a ratio of industry demand to FAA staffing levels; these limits are controlled by the present four FAA Certification Directorates (transports, small airplanes, rotorcraft, engines/propellers).

A general summary of DER "Authority and Responsibilities" is shown in Appendix II.

Especially noteworthy is the fact that all technical data submitted to the FAA by an applicant or holder of a type certificate are considered confidential, and may not be released by the FAA without written permission of the type certificate holder. It is therefore the responsibility of a DER to obtain such permission with reference to "previously approved data" as necessary.

In certain cases, following coordination with the FAA, a DER may, within the limits of his authority, approve data covering major changes in a type design which are not so significant as to require a new type certificate (see FAR 21.113), and obtain a Supplemental Type Certificate (STC). Such a finding is subject to FAA review.

### Significant Contributions to Safety by DER's.

Contributions by DERs may be divided broadly into 2 categories, i. as a group, and ii. as individual DERs.

i. DER Contributions as a group

As a group, DERs have a wide range of practical industry design and manufacturing experience. This includes basic design concepts, lessons learned from previous product design and operation, the correlation between predicted and actual performance and safety features of airplanes, and the effect of their design on maintenance practices.

This wide background experience makes it possible for DERs to contribute to numerous FAA functions and responsibilities. A few examples are:

a. Airworthiness Directives (AD): -

When a safety-related problem is identified by the FAA as a result of aircraft incidents, accidents or maintenance problems, the FAA is required to take corrective action. In many instances the FAA will consult DERs familiar with the particular aircraft type and system to develop AD data and solutions. As a part of this process, the FAA frequently refers to manufacturers Service Bulletins for their ADs. Generally, each Service Bulletin has been reviewed by the Manufacturers DERs before release. In the case of an AD, it is FAA policy, to require FAA engineering approval. However, the contents of such safety related bulletins are first reviewed by DERs. The FAA relies heavily on their judgment.

b. Malfunction and Defect Reports (MDR):

- Although the responsibility for reporting rests upon operators and manufacturers for those reportable malfunctions and defects required by FAR 21.3, the DERs play a major role in this reporting process by monitoring and analyzing the reports received by their employing manufacturer. They also participate in reviewing and reporting malfunctions of foreign operators.

c. Regulations and Regulation Changes:

- The FAA often requests DERs to provide comments on proposed new regulations or changes to existing rules. The DERs practical knowledge of the potential effect of such proposed changes is frequently a valuable guide to help make the changes realistic, while achieving the FAA's objectives.

d. FAA Advisory Circulars (AC): - In

order to give guidance to the aviation community, the FAA publishes many general and specific ACs. These ACs provide information on methods to show compliance with the regulations, guidance for design and testing, and regulatory interpretations. The DERs as a group have made many major contributions to these ACs over the years. This is true particularly in the new

technology areas where the DER's current expertise combined with their knowledge of the regulations is of great value. Some major examples are: AC 25-4, AC 25.1309-1, AC 25.571-1, AC 120-28C, etc.

ii. Individual DER Contributions

Particular contributions by individual DERs include review of design data for compliance with the regulations, test observations, and data review for certification tests, in addition to their individual contributions to items i. above.

Legal and Ethical Concerns

Two areas are worthy of discussion here: (i.) the matter of Legal Liability for DERs and (ii.) the potential conflict of interest raised by the public media from time to time.

i. The legal liability issue.

The FAA has been challenged with this issue for a number of years. A position has been stated in the FAA's Northwest Mountain Region Newsletter dated December 6, 1987 as shown in Appendix III.

However, others may take a different view. For instance, it could be argued that the designees are appointed by specific FAA managers who impose limitations upon each designee's authority. Thereafter, each designee is subject to close supervision by an FAA manager who gives personal guidance, keeps approval records and asks to be kept informed continuously of the designee's activities. The FAA manager's staff review data submitted and approved by each designee, while retaining the right of disapproval. The FAA management also gives interpretations to designees applicable to individual cases. Someone might therefore argue that designees are acting under the close control of FAA management and are therefore agents of the FAA.

The authors do not claim to be qualified to enter the legal argument; they only wish to present some of the issues raised without any judgment as to their merit.

ii. The Conflict of Interest Issue.

From time to time this issue has been raised by various parties. It is summarized as follows:

On the one hand, some Designees are appointed who are also employees of a manufacturer, or of an operator of aircraft. For instance airplane manu-

facturers have engineering employees appointed by the FAA to act as Designated Engineering Representatives and Designated Manufacturing Inspection Representatives, or airplane operators (airlines have employees appointed as Airman Medical Examiners, Dispatchers, DERs, etc.

It has been suggested that conflict of interest situations exist when designees make findings of compliance with FAA regulations while they are also beholden to their employers.

Experience has shown, however, that designees are strongly motivated to be impartial and conscientious when making findings because of their accountability to the FAA, and their own liability concerns. Similarly, employers are motivated by the threat of legal action to avoid undue influence on employees. Both parties are motivated to maintain reputations for integrity and safety orientation.

This issue has been thoroughly investigated by the United States National Academy of Sciences, Committee on FAA Airworthiness Certification Procedures. Their report is titled "Aircraft Safety- FAA Certification of Commercial Passenger Aircraft", June 24, 1980. A part of their conclusions are quoted in Appendix IV.

However, the report also suggested various procedural improvements which it recommended to the FAA for implementation.

#### Summary and Conclusion

a. The FAA designee system fulfills a need which could probably not be filled by direct government service because it would be prohibitively expensive to hire so many experts. It utilizes the experience of industry personnel who are current in their knowledge of the technology they are working with at any given time.

b. The system has been in existence for more than 25 years and has been improved and refined with time.

c. The independent National Academy of Sciences review by the "Low Committee" (so named after its Chairman, Professor George Low) has confirmed the indispensability and high quality of service rendered by DERs for aircraft certification.

d. The liability threat is a significant motivating factor for designees to perform at their best and most impartial level.

e. A designee system can work well if essential ingredients are present, including:

i. A code of clearly worded and easily understandable aviation regulations.

ii. An impartial review process for problems, interpretations and disagreements.

iii. Clear guidance and periodic supervision by the regulator of the designees, and regular review of their individual performance.

iv. The above require continuous and direct face to face communication and contact between the regulators and their designees.

#### References

1. FAA Order 8110.37 - Designated Engineering Representative (DER) Guidance Handbook, AWS-110, September 26, 1979.

2. FAA Order 8110.1 - Designated Engineering Representatives ANW-210, July 30, 1973.

3. FAA Order 8110.4 - Type Certification. AFS-103, December 28, 1967.

4. FAA Certification Procedures: An FAA Perspective; In Response to the "Blue Ribbon Panel" Report (Ref. 5), FAA, Washington D.C., January 1981.

5. Federal Aviation Regulations, Part 183 - Representatives of the Administrator. Title 24 - Code of Federal Regulations (CFR), as amended.

Note: Items 1 - 5 Available from U.S. Dept. of Transportation Federal Aviation Administration Office of International Affairs (AIA - 100, 800 Independence Ave. S.W. Washington D.C., 205591

6. Federal Aviation Act of 1958. - (Act of August 23, 1958, 72 Statute 731), as amended. Congress of the United States.

7. Department of Transportation Act, - (Act of October 15, 1966, 80 Statute 931), as amended. Congress of the United States.

8. A Thorough Critique of Certification of Transport Category Aircraft by the Federal Aviation Administration - Sixteenth Report by the Committee on Government Operations. 90th Congress, 2nd Session. House Report No. 96-924. U.S. Government Printing Office, Washington, 1980.

9. Turbulence Aloft - The Civil  
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10. Improving Aircraft Safety -  
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8110.37 )  
Appendix 2)

Appendix I.

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FIGURE 2. CHART A2  
DELEGATED FUNCTIONS AND AUTHORIZED AREAS  
DESIGNATED ENGINEERING REPRESENTATIVES  
STRUCTURAL

DELEGATED FUNCTIONS		AUTHORIZED AREAS															
		Metallic Materials & Processes	Non-Destructive Testing	Metallurgy	Metal Joining Processes	Structural Adhesives	Mechanical Fasteners	Surface Treatments & Coatings	Bearings	Nonmetallic Materials & Processes	Transparent (Glazed) Materials	Polymeric Materials	Structural Adhesives	Mechanical Fasteners	Reinforced Composites	Non-Destructive Testing	Surface Treatments & Coatings
		J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	
14.	Witness Official Development & Qualification Tests	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
15.	Approve Test Results						x	x				x		x	x		
16.	Approve Individual Test Plans	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
17.	Recommend Approval of Development and Qualification Test Programs	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
18.	Write Conformity Inspection Requests	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
19.	Approve Complete Material & Process Specifications (On FAA Approved List)					x	x	x				x		x	x		

Appendix II.

From: FAA Handbook 8110.4

Authority and Responsibility of a DER

a. General. Engineering designees will:

- (1) Ascertain that all numerical work has been checked and found satisfactory with respect to accuracy and completeness and assumptions, and for compliance with pertinent (regulations)...
- (2) Coordinate with FAA with respect to the conduct and witnessing of static, powerplant, system operation, structural or flight test programs, as may be appropriate to the type of work for which they are designated...
- (3) Be responsible for assuring that engineering reports, drawings, drawing lists, and other pertinent data which he has examined, together with his (written) approval of/or recommendations regarding the data, are forwarded to the FAA in sufficient time to serve all necessary purposes...
- (4) Be responsible for certifying to the FAA that these data (reports, drawings, tests, etc.) approved by him comply with applicable regulations, policies and procedures acceptable to the FAA, with approved specifications or allowables, and with basic load criteria or test programs...
- (5) Participate as advisors in the activities of (FAA) Type Certification Boards insofar as their responsibilities warrant...
- (6) Consult with FAA regional personnel whenever any question arises regarding interpretation of the Federal Aviation Regulations or the use of new or unconventional materials and processes..... or departures from "standard" analytical procedures or detail design (that) have been used in the technical data being reviewed...
- (7) Approve production and service changes to a model (type design) that is type certificated...
- (8) Approve manufacturer's service bulletins issued to accomplish modifications and alterations in the field...
- (9) Be specifically authorized to examine and approve related or special data or reports such as loading schedules or devices, weight and balance reports, equipments lists, etc...

Appendix III.

From : FAA Designee Newsletter Edition 6; December 7, 1987 page 2

Designee Liability.

The liability of the U.S. for the acts of its employees is governed by the terms of the Federal Tort Claims Act, 28 U.S.C., Section 2671 et seq. With certain important exceptions, this act makes the government liable to the same extent as a private individual, under like circumstances, for the negligent or wrongful acts or omissions of its employees while acting within the scope of their employment.

In addition, the Act provides that, so long as the employee's actions were within the scope of employment, the government, rather than the employee, would be held liable.

"Employee of the government" is defined by 28 U.S.C., Section 2671, to include "persons acting on behalf of a Federal agency in an official capacity, temporarily or permanently in the service of the United States, whether with or without compensation." FAA project engineers, therefore, are Federally protected for the findings they make when acting within the scope of their official responsibilities.

The application of this definition to the designee situation depends on the many factors involved in determining whether an agency relationship exists between the FAA and the designee. The most important factor in this determination is the degree of control exercised, or the right of control retained, by the U.S. over details of the work performed by the designee.

The FAA and Justice Department have consistently held the position that, because of a lack of control over the actual work performed by the designee, the designee is not the agent of the FAA, but is an independent contractor. As such, the designee would not be considered an employee under the above definition, and would be personally liable for his own actions.

Designees, as private individuals, are covered by the general tort law. Under general tort law, individuals may be held liable for careless or intentional conduct which causes harm to others. The standards that courts apply to determine whether conduct is careless is whether, under the same circumstances, a reasonably prudent person would have done the same thing. Therefore, as applied to designees, the issue would be whether an engineer with the same type of expertise would have reasonably

reached the same conclusion on a given engineering issue. A designee's best protection is to limit his exposure by being very clear and specific as to what he is approving, making sure his conclusions, and the reasons for them, are well documented. (End of quote)

#### Appendix IV

From the National Academy of Sciences Committee on Airworthiness Certification Procedures report dated June 24, 1980 (pages 6 & 7):

"...The 'designees' are senior engineers employed by the manufacturers who possess detailed knowledge of the design, based on daily involvement that is not practical or (realistic) for FAA personnel to achieve.

Accordingly, the advantages of the designee system as an extension of the limited FAA staff are apparent. Yet the system is often criticized. The possible disadvantage is the appearance, if not the existence, of a lack of independent objectivity -- i.e., a form of conflict of interest for the designee who is in the position of serving two masters. the aircraft manufacturing firm that pays him and the FAA to which he is expected to report problems. The committee finds, however, that potentials for conflict are checked in the following ways:

- (i) engineers are ethically motivated to maintain their reputation for technical integrity and professionalism;
- (ii) recognizing the stake of the manufacturer in assuring a safe serviceable and reliable airplane, the company's designees perform traditional engineering review tasks for the FAA the would, by and large, be performed for the company as well;
- (iii) the designees perform their work under the supervision of the FAA staff; and
- (iv) the FAA reserves to its own staff the most critical design decisions and approvals.

As the system is presently organized, therefore, the committee concludes that the designee system for augmenting the capability of the FAA to review and certify the type design is not only appropriate but indispensable.

"...The committee therefore recommends that the FAA continue to use Designated Engineering Representatives to perform the functions now delegated to them..."  
(End of quote)