[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2001-9634, FAA-2001- 9633, FAA-2001-9638, FAA-2001-9637; Amendment No. 25-113]

RIN: 2120-AI21

Electrical Equipment and Installations, Storage Battery Installation; Electronic Equipment; and Fire Protection of Electrical System Components on Transport Category Airplanes

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The FAA amends the regulations governing airworthiness standards for transport category airplanes concerning: electrical equipment; nickel cadmium battery installation and storage; electrical cables; design and installation of electronic equipment; and fire protection of electrical system components. Adoption of these amendments eliminates significant regulatory differences between the airworthiness standards of the U.S. and the Joint Aviation Requirements of Europe, without affecting current industry design practices.

DATE: This amendment becomes effective [Insert date 30 days after date of publication in the Federal Register.]

FOR FURTHER INFORMATION CONTACT: Stephen Slotte, FAA, Airplane and Flight Crew Interface Branch, ANM-111, Federal Aviation Administration, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, WA 98055-4056; telephone 425-227-2315; facsimile 425-227-1320, e-mail steve.slotte@faa.gov.

SUPPLEMENTARY INFORMATION:

How Can I Obtain a Copy of this Final Rule?

You can get an electronic copy using the Internet by:

(1) Searching the Department of Transportation's electronic Docket Management System (DMS) web page (http://dms.dot.gov/search);

(2) Visiting the Office of Rulemaking's web page at http://www.faa.gov/avr/arm/index.cfm; or

(3) Accessing the Government Printing Office's web page at http://www.access.gpo.gov/su_docs/aces/aces140.html.

You can also request a copy from the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Avenue SW., Washington, DC 20591 [(202) 267-9680]. Be sure to identify the amendment number or docket number of this rulemaking.

Small Business Regulatory Enforcement Fairness Act

The Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 requires FAA to comply with small entity requests for information or advice about compliance with statutes and regulations within our jurisdiction. If you are a small entity and you have a question regarding this document you may contact your local FAA official

or the person listed under FOR FURTHER INFORMATION CONTACT. You can find out more about SBREFA on the Internet at http://www.faa.gov/avr/arm/sbrefa.htm, or by e-mailing us at 9-AWA-SBREFA@faa.gov.

Background

This final rule responds to recommendations of the Aviation Rulemaking Advisory Committee (ARAC) submitted under the FAA's Fast Track Harmonization Program. It amends six sections of the regulations governing airworthiness standards for transport category airplanes concerning: electrical installation, nickel cadmium battery installation and storage; electrical cables; design and installation of electronic equipment; and fire protection of electrical system components. The FAA proposed these changes in four notices of proposed rulemaking (NPRM). The notices and the affected sections are listed in the table below.

Change No.	14 CFR Section No.	Section Title	Notice No.	Federal Register Publication/ Publication Date
1	§ 25.1353(a)	Electrical equipment and installations.	01-04	66 FR 27582 05/17/2001
2	§ 25.1353(c)(5)	Storage batteries.		
3	§ 25.1353(c)(6)	Storage batteries.		
4	§ 25.1353(d)	Electrical cables and cable installations.	01-03	66 FR 26942 05/15/2001
5	§ 25.1431(d)	Electronic equipment.	01-07	66 FR 26956 05/15/2001
6	§ 25.869(a)(4)	Fire protection; systems.	01-06	66 FR 26964 05/15/2001

In these notices you will find a history of the problems and discussions of the safety considerations supporting our course of action. You also will find a discussion of the current requirements and why they do not adequately address the problem. We also refer to the recommendations of the ARAC we relied on in developing the proposed rule. The NPRMs also discuss each alternative that we considered and the reasons for rejecting the ones we did not adopt.

The background material in the NPRM also contains the basis and rationale for these requirements and, except where we have specifically expanded on the background elsewhere in this preamble, supports this final rule as if it were contained here. That is, any future discussions regarding the intent of the requirements may refer to the background in the NPRM as though it was in the final rule itself. It is therefore not necessary to repeat the background in this document.

History

In the United States, Title 14, Code of Federal Regulations (CFR) part 25 contains the airworthiness standards for type certification of transport category airplanes. Manufacturers of transport category airplanes must show that each airplane they produce of a different type design complies with the appropriate part 25 standards.

In Europe, Joint Aviation Requirements (JAR)-25 contains the airworthiness standards for type certification of transport category airplanes. The Joint Aviation Authorities (JAA) of Europe developed these standards, which are based on part 25, to provide a common set of airworthiness standards within the European aviation community. Thirty-seven European countries accept airplanes type certificated to the

JAR-25 standards, including airplanes manufactured in the U.S. that are type certificated to JAR-25 standards for export to Europe.

Although part 25 and JAR-25 are similar, they are not identical in every respect. When airplanes are type certificated to both sets of standards, the differences between part 25 and JAR-25 can result in substantial added costs to manufacturers and operators. These added costs, however, often do not bring about an increase in safety.

Recognizing that a common set of standards would not only benefit the aviation industry economically but also preserve the necessary high-level of safety, the FAA and the JAA began an effort in 1988 to "harmonize" their respective aviation standards.

After beginning the first steps towards harmonization, the FAA and JAA soon realized that traditional methods of rulemaking and accommodating different administrative procedures was neither sufficient nor adequate to make noticeable progress towards fulfilling the harmonization goal. The FAA identified the ARAC as an ideal vehicle for helping to resolve harmonization issues, and in 1992, the FAA tasked ARAC to undertake the entire harmonization effort.

Despite the work that ARAC has undertaken to address harmonization, there remain many regulatory differences between part 25 and JAR-25. The current harmonization process is costly and time-consuming for industry, the FAA, and the JAA. Industry has expressed a strong desire to finish the harmonization program as quickly as possible to alleviate the drain on their resources and finally to establish one acceptable set of standards.

Recently, representatives of the FAA and JAA proposed an accelerated process to reach harmonization, the "Fast Track Harmonization Program." The FAA initiated the

Fast Track Harmonization Program on November 26, 1999 (64 FR 66522). This rulemaking has been identified as a "fast track" project.

Further details on ARAC, and its role in the harmonization rulemaking activity, and the Fast Track Harmonization Program can be found in the tasking statement (64 FR 66522, November 26, 1999) and the first NPRM published under this program, Fire Protection Requirements for Powerplant Installations on Transport Category Airplanes (65 FR 36978, June 12, 2000).

Related Activity

The new European Aviation Safety Authority (EASA) was established and formally came into being on September 28, 2003. The JAA worked with the European Commission (EC) to develop a plan to ensure a smooth transition from JAA to the EASA. As part of the transition, the EASA will absorb all functions and activities of the JAA, including its efforts to harmonize JAA regulations with those of the U.S. This rule is a result of the FAA and JAA harmonization rulemaking activities. It adopts the more stringent requirements of the JAR standards. These JAR standards have already been incorporated into the EASA "Certification Specifications for Large Aeroplanes" CS-25, in similar if not identical language. The EASA CS-25 became effective on October 17, 2003.

Discussion of the Comments

Electrical Installation, Nickel Cadmium Battery Installation, and Nickel Cadmium Battery Storage, RIN 2120-AH27

On May 17, 2001, the FAA published a notice of proposed rulemaking (Notice No. 01-04, 66 FR 27582) entitled, "Electrical Installation, Nickel Cadmium Battery

Installation, and Nickel Cadmium Battery Storage." In the NPRM, the FAA proposed to amend three sections of 14 CFR part 25 regarding airworthiness standards for transport category airplanes concerning electrical equipment and installations to harmonize the standards with those of the associated JAR-25. In the NPRM, the proposed title of § 25.1353 is incorrect. This final rule corrects the title of § 25.1353 to read "Electrical equipment and installations." For electrical equipment installations, the FAA proposed to add text from the associated JAR to harmonize the requirements, and to clarify the intent of this regulation. For nickel cadmium batteries, the FAA proposed to expand the applicability of the regulation to all nickel cadmium battery sizes, regardless of their capabilities. In addition, the FAA proposed to adopt the associated JAR Advisory Circular Joint (ACJ) material for both electrical equipment and nickel cadmium battery installations.

General Comment

The FAA received four comments in response to the proposed rule. Two of the four commenters support the proposed changes. The other two commenters disagreed with the cost estimates in the proposal, as discussed below.

Comment: The third and fourth commenters submitted their comments through the Air Transport Association of America (ATA). The ATA provided comments that "indicate the cost estimates in the proposal are flawed because they do not address the cost of compliance when installing new equipment in existing airplanes."

FAA Reply: The FAA does not concur. The cost and technical impacts on existing aircraft due to harmonization of these rules are expected to be minimal because of the following:

1. These harmonized rules will, in general, not be applicable to existing airplanes or modifications to existing airplanes that were certified to earlier amendment levels as defined on the Type Certificate Data sheet. An exception may be new derivative airplane models or modifications to existing models that are deemed significant enough to require application of later amendment levels per 14 CFR 21.101.

2. It is anticipated that any modifications or retrofit changes that require a showing of compliance to the harmonized rules for nickel cadmium batteries §§ 25.1353(c)(5) and (c)(6) will, in general, not require compliance to later amendments.

3. The requirements for temperature sensing, monitoring, and warning, in general apply to batteries that have high enough energy sources to be a hazard, and are typically main airplane batteries or APU start type batteries. Main airplane batteries (which have engine ignition as a stand-by load) or APU start batteries already are required to have this sensing and monitoring functionality.

4. This regulation will not be applicable to flashlights or emergency lighting equipment (dry cell type batteries as they generally have low energy-charging type systems (trickle charge)); unless there were to be new designs or new technologies that warrant this type of battery monitoring and sensing due to potentially hazardous effects.

5. Harmonization of § 25.1353(a) with JAR 25.1353(a) provides consistency with existing rules, § 25.1431, and with the harmonized § 25.1309. The intent of both rules is the same in that the airplane is required to be designed with electrical interference

effects that have no unsafe effects on the airplane, systems, or occupants. This rule provides further definition in terms of the level of safety or probability of failure that is required. The main difference between § 25.1353(a) and JAR 25.1353(a) is the use of the term "extremely remote," which is defined as follows:

> *Extremely Remote Failure Condition:* a failure condition that is not anticipated to occur to each airplane during its total life, but which may occur a few times when considering the total operational life of all airplanes of the type. [NOTE: The term 'extremely remote' has been used previously within 14 CFR part 25 to describe a condition so remote that it is not anticipated to occur in service on any transport category airplane (i.e., 'extremely improbable'). However, for the purposes of this regulation, the term "extremely remote" will have the meaning specified above.]

This is further supported by the Advisory Circular Joint (ACJ) 25.1353(a), "Acceptable Means of Compliance and Interpretation," Section Two of the Joint Aviation Requirements (JAR-25).

The FAA has adopted the JAR ACJ material as an acceptable means of showing compliance with the revision to § 25.1353(a) and has developed an Advisory Circular (AC). The FAA will publish a Notice of Availability in the Federal Register after the AC is issued.

Changes: No changes were made as a result of this comment.

FAA Disposition of Comments: The FAA adopts the changes as proposed in the NPRM, Notice No. 01-04.

Electrical Cables, RIN 2120-AH29

On May 15, 2001, the FAA published a notice of proposed rulemaking (Notice No. 01-03, 66 FR 26942) entitled, "Electrical Cables." In the NPRM, the FAA proposed harmonizing the standards by revising the regulation to adopt the text of the associated JAR-25. The proposed revision would specify a design action to be taken, and remove the possibility that a designer may not consider a critical installation design condition.

General Comment

The FAA received one comment to both Notice No. 01-03 and Notice No. 01-07. The commenter fully supports the proposal.

Comment: The commenter fully supports the adoption of these amendments to reduce the differences between part 25 and JAR-25. Further, the commenter states that the fruits of the ARAC's considerable efforts should enable the FAA to complete this rulemaking quickly.

Changes: No changes were made as a result of this comment.

FAA Disposition of Comment: The FAA adopts the changes as proposed in the NPRM, Notice No. 01-03.

Design and Installation of Electronic Equipment on Transport Category Airplanes, RIN 2120-AH28

On May 15, 2001, the FAA published a notice of proposed rulemaking (Notice No. 01-07, 66 FR 26956) entitled, "Design and Installation of Electronic Equipment on Transport Category Airplanes." In the NPRM, the FAA proposed to revise § 25.1431 to add a new paragraph (d) that would be parallel to JAR-25.1431(d). The proposal would provide one location in the regulations that explicitly addresses requirements related to

electrical power supply transients, clarify the objective of the other related regulations in part 25, and harmonize 14 CFR part 25 with the associated JAR-25.

General Comment

The FAA received one comment to both Notice No. 01-03 and Notice No. 01-07. The commenter fully supports the proposal.

Comment: See Comment under "Electrical Cables" above.

Changes: No changes to the rule as proposed are necessary.

FAA Disposition of Comment: The FAA adopts the changes as proposed in the NPRM, Notice No. 01-07.

Fire Protection of Electrical System Components on Transport Category Airplanes, RIN 2120-AG92

On May 15, 2001, the FAA published a notice of proposed rulemaking (Notice No. 01-06, 66 FR 26964) entitled, "Fire Protection of Electrical System Components on Transport Category Airplanes." In the NPRM, the FAA proposed to revise § 25.869(a), concerning the protection of electrical system components, to adopt the more stringent language in the parallel JAR-25.

General Comment

The FAA received three comments in response to the proposed rule. Two of the commenters agree with the proposal and recommend its adoption. The third commenter suggested a change to the applicability of the rule, as discussed below.

Comment: The commenter states, "Regulatory changes should apply to airplanes or electrical components manufactured after the date the CFR is changed. The CFR

change should not be retroactive to airplanes manufactured before this new regulation is enacted."

FAA Reply: The harmonized § 25.869(a) and JAR 25.869(a) will be incorporated into later revisions of 14 CFR part 25 and are not retroactive. Therefore, these harmonized rules will, in general, not be applicable to existing airplanes or electrical components that were certified to earlier amendment levels as defined on the Type Certificate Data sheet for the airplane models in question. An exception may be new derivative airplane models or modifications to existing models that are deemed significant enough to require application of later amendment levels per 14 CFR 21.101.

There is currently no FAA advisory material related to the standard. However, the FAA has developed AC 25.869-1X, "Electrical System Fire and Smoke Protection." It contains guidance on this subject and includes, with some modification, the material currently in the JAA's ACJ 25.869. The FAA will publish a Notice of Availability in the Federal Register after the AC is issued.

Changes: No changes were made as a result of this comment.

FAA Disposition of Comment: The FAA adopts the changes as proposed in the NPRM, Notice No. 01-06.

What Regulatory Analyses and Assessments Has the FAA Conducted?

Economic Evaluation, Regulatory Flexibility Determination, Trade Impact Assessment, and Unfunded Mandates Assessment

Changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs each Federal agency to propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs.

Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act (19 U.S.C. section 2531-2533) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S. standards, this Trade Act also requires agencies to consider international standards and, where appropriate, that they be the basis of U.S. standards. Fourth, the Unfunded Mandates Reform Act of 1995 requires agencies to prepare a written assessment of the costs, benefits and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local or tribal governments, in the aggregate, or by the private sector, of $100 million or more annually (adjusted for inflation).

In conducting these analyses, the FAA has determined that this final rule:

1. has benefits that do justify its costs, is not a "significant regulatory action" as defined in the Executive Order, and is not "significant' as defined in DOT's Regulatory Policies and Procedures;
2. will not have a significant economic impact on a substantial number of small entities;
3. reduces barriers to international trade; and,
4. imposes no unfunded mandates on State, local, or tribal governments, or the private sector.

The (DOT) Order 2100.5, "Regulatory Policies and Procedures," prescribes policies and procedures for simplification, analysis, and review of regulations. If it is determined that the expected impact is so minimal that the rule does not warrant a full evaluation, a statement to that effect and the basis for it is included in the regulation. We

provide the basis for this minimal impact determination below. We received no comments that conflicted with the economic assessment of minimal impact published in the notices of proposed rulemaking for this action. Given the reasons presented below, we have determined that the expected impact of this rule is so minimal that the final rule does not warrant a full evaluation.

Currently, airplane manufacturers must satisfy both the 14 CFR and the European JAR certification standards to market transport category airplanes in both the United States and Europe. Meeting two sets of certification requirements raises the cost of developing new transport category airplanes often with no increase in safety. In the interest of fostering international trade, lowering the cost of airplane development, and making the certification process more efficient, the FAA, JAA, and airplane manufacturers have been working to create, to the maximum possible extent, a single set of certification requirements accepted in both the United States and Europe. As discussed previously, these efforts are referred to as harmonization. This final rule results from the FAA's acceptance of ARAC harmonization working group recommendations. Members of the ARAC working groups agreed that the requirements of this rule will not impose additional costs to U.S. manufacturers of part 25 airplanes.

Specifically, this final rule requires:

1. revising §§ 25.1353(a), (c)(5), and (c)(6), and 25.869(a) to adopt the "more stringent" requirements currently in those same sections of JAR-25;
2. adding § 25.1353(d) to adopt JAR 25.1353(d) in its entirety; and,
3. adding a new § 25.1431(d) to incorporate the "more stringent" requirement of paragraph 25.1431(d) of the JAR.

We consider that this rule will neither reduce nor increase the requirements beyond those that are already met by U.S. manufacturers to satisfy European airworthiness standards.

As this rule neither increases nor decreases certification requirements beyond those already in existence, we have determined there will be no cost associated with this rule to part 25 manufacturers. We have not tried to quantify the benefits of this amendment beyond identifying the expected harmonization benefit. This amendment eliminates an identified significant regulatory difference (SRD) between part 25 and JAR-25 wording. Eliminating the SRD will provide for a more consistent interpretation of the rules and, thus, is an element of the potentially large cost savings of harmonization.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) directs the FAA to fit regulatory requirements to the sale of the business, organizations, and governmental jurisdictions subject to regulation. We are required to determine whether a proposed or final action will have a "significant economic impact on a substantial number of small entities" as defined in the Act.

If we find the action will have a significant impact, we must do a "regulatory flexibility analysis." If, however, we find the action will not have a significant economic impact on a substantial number of small entities, we are not required to do the analysis. In this case, the Act requires that we include a statement that provides the factual basis for our determination.

We have determined that this amendment will not have a significant economic impact on a substantial number of small entities for two reasons:

First, the net effect of the final rule is regulatory cost relief. The amendment requires that new transport category airplane manufacturers meet just the "more stringent" European certification requirement, rather than both the United States and European standards. Airplane manufacturers already meet or expect to meet this standard as well as the existing part 25 requirements.

Second, all United States manufacturers of transport category airplanes exceed the Small Business Administration small-entity criteria of 1,500 employees for airplane manufacturers. Those U.S. manufacturers include: The Boeing Company, Cessna Aircraft Company, Gulfstream Aerospace, Learjet (owned by Bombardier Aerospace), Lockheed Martin Corporation, McDonnell Douglas (a wholly owned subsidiary of The Boeing Company), Raytheon Aircraft, and Sabreliner Corporation.

The FAA received no comments that differed with the assessment given in this section. Since this final rule is cost relieving and there are no small entity manufacturers of part 25 airplanes, the FAA Administrator certifies that this final rule will not have a significant economic impact on a substantial number of small entities.

Trade Impact Assessment

The Trade Agreement Act of 1979 prohibits Federal agencies from establishing any standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Legitimate domestic objectives, such as safety, are not considered unnecessary obstacles. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards.

This rule is consistent with Trade Agreement Act as the European standards are the basis for these U.S. regulations.

Unfunded Mandates Assessment

The Unfunded Mandates Reform Act of 1995 (the Act), is intended, among other things, to curb the practice of imposing unfounded Federal mandates on State, local, and tribal governments. Title II of the Act requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in the expenditure by of $100 million or more (adjusted annually for inflation) in any one year by State, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a "significant regulatory action."

This final rule does not contain such a mandate. The requirements of Title II of the Act, therefore, do not apply.

What Other Assessments Has the FAA Conducted?

Paperwork Reduction Act

Under the provisions of the Paperwork Reduction Act of 1995, there are no current or new requirements for information collection associated with this final rule.

International Compatibility

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to comply with International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. The FAA has determined that there are no ICAO Standards and Recommended Practices that correspond to these regulations.

Executive Order 13132, Federalism

The FAA analyzed this final rule and the principles and criteria of Executive Order 13132, Federalism. We determined that this action will not have a substantial direct effect on the States, or the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, we determined that this final rule does not have federalism implications.

Regulations Affecting Intrastate Aviation in Alaska

Section 1205 of the FAA Reauthorization Act of 1996 (110 Stat. 3213) requires the Administrator, when modifying regulations in Title 14 of the CFR in a manner affecting intrastate aviation in Alaska, to consider the extent to which Alaska is not served by transportation modes other than aviation, and to establish such regulatory distinctions as he or she considers appropriate. Because this final rule applies to the certification of future designs of transport category airplanes and their subsequent operation, it could affect intrastate aviation in Alaska. Because no comments were received regarding this regulation affecting intrastate aviation in Alaska, we will apply the rule in the same way that it is being applied nationally.

Plain Language

Executive Order 12866 (58 FR 51735, Oct. 4, 1993) requires each agency to write regulations that are simple and easy to understand. We invite your comments on how to make these regulations easier to understand, including answers to questions such as the following:

- Are the requirements in the regulations clearly stated?
- Do the regulations contain unnecessary technical language or jargon that interferes with their clarity?
- Would the regulations be easier to understand if they were divided into more (but shorter) sections?
- Is the description in the final rule preamble helpful in understanding the regulations?

Please send your comments to the address specified in the FOR FURTHER INFORMATION CONTACT section.

Environmental Analysis

FAA Order 1050.1D defines FAA actions that may be categorically excluded from preparation of a National Environmental Policy Act (NEPA) environmental impact statement. In accordance with FAA Order 1050.1D, appendix 4, paragraph 4(j), this final rule qualifies for a categorical exclusion.

Energy Impact

The FAA has assessed the energy impact of this final rule in accordance with the Energy Policy and Conservation Act (EPCA) and Public Law 94-163, as amended (43 U.S.C. 6362), and FAA Order 1053.1. We have determined that the final rule is not a major regulatory action under the provisions of the EPCA.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The Amendment

In consideration of the foregoing, the Federal Aviation Administration amends part 25 of Title 14, Code of Federal Regulations, as follows:

PART 25 - AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

1. The authority citation for part 25 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702 and 44704

JDC 3/12/04 Move to Instruction #3

2. Amend § 25.1353 by revising paragraphs (a), (c)(5), and (c)(6), and by adding a new paragraph (d) to read as follows:

§ 25.1353 Electrical equipment and installations.

(a) Electrical equipment, controls, and wiring must be installed so that operations of any one unit or system of units will not adversely affect the simultaneous operation of any other electrical unit or system essential to the safe operation. Any electrical interference likely to be present in the airplane must not result in hazardous effects upon the airplane or its systems except under extremely remote conditions.

* * * * *

(c) * * *

(5) Each nickel cadmium battery installation must have provisions to prevent any hazardous effect on structure or essential systems that may be caused by the maximum amount of heat the battery can generate during a short circuit of the battery or of individual cells.

(c) Nickel cadmium battery installations must have -

(i) A system to control the charging rate of the battery automatically so as to prevent battery overheating; or

(ii) A battery temperature sensing and over-temperature warning system with a means for disconnecting the battery from its charging source in the event of an over-temperature condition; or

(iii) A battery failure sensing and warning system with a means for disconnecting the battery from its charging source in the event of battery failure.

(d) Electrical cables and cable installations must be designed and installed as follows:

(1) The electrical cables used must be compatible with the circuit protection devices required by § 25.1357 of this part, such that a fire or smoke hazard cannot be created under temporary or continuous fault conditions.

(2) Means of permanent identification must be provided for electrical cables, connectors and terminals.

(3) Electrical cables must be installed such that the risk of mechanical damage and/or damage caused by fluids, vapors, or sources of heat, is minimized.

DE 3/2/04

Move to Instruction #4

Insert §

3. Amend section 25.1431 by adding a new paragraph (d) to read as follows:

§ 25.1431 Electronic equipment.

* * * * *

(d) Electronic equipment must be designed and installed such that it does not cause essential loads to become inoperative as a result of electrical power supply transients or transients from other causes.

IDC 3/12/04

Move to Instruction #2

Insert §

4. Amend section 25.869 by revising paragraph (a)(4) to read as follows:

§ 25.869 Fire protection: systems.

(a) * * *

(4) Insulation on electrical wire and electrical cable installed in any area of the airplane must be self-extinguishing when tested in accordance with the applicable portions of part I, appendix F of this part.

* * * * *

Issued in Renton, Washington, on March 9, 2004.

Franklin Tiangsing

Franklin Tiangsing
Acting Manager
Transport Airplane Directorate
Aircraft Certification Service

Certified to be a **True Copy**