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14 CFR Part 39

[Docket No. 92-NM-67-AD]

Airworthiness Directives; Boeing Models 707, 727, 737, 747, and 757 Series Airplanes; and McDonnell Douglas Models DC-8, DC-9, and DC-10 Series Airplanes

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: This document proposes the supersedure of an existing airworthiness directive (AD), applicable to Boeing and McDonnell Douglas airplanes, which currently requires certain operational and equipment changes and design modifications to be accomplished to maximize fire detection and protection in main deck cargo compartments. The existing rule was issued based on the FAA's determination that the existing Class B cargo compartment firefighting procedures and fire protection features were inadequate, and could result in the loss of an airplane. This action would require certain design modifications and operational requirements to ensure an adequate level of safety on airplanes with Class B cargo compartments. This proposal is prompted by comments from the public and additional information received after issuance of the existing AD.

DATES: Comments must be received no later than October 5, 1992.

ADDRESSES: Submit comments in triplicate to the Federal Aviation Administration (FAA), Transport Airplane Directorate, ANM-103, Attention: Rules Docket No. 92-NM-67-AD, 1601 Lind Avenue SW., Renton, Washington 98055-4056. Comments may be inspected at this location between 9 a.m. and 3 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: For information concerning Boeing airplanes, contact Ms. Susan Letcher, Aerospace Engineer, Seattle Aircraft Certification Office, Systems and Equipment Branch, ANM-130S, FAA, Transport Airplane Directorate, 1601 Lind Avenue SW., Renton, Washington 98055-4056; telephone (206) 227-2670, fax (206) 227-1181. For information concerning McDonnell Douglas airplanes, contact Mr. Kevin Kuniyoshi (for McDonnell Douglas airplanes), Aerospace Engineer, Los Angeles Aircraft Certification Office, Mechanical/Environmental and Crashworthiness Section, ANM-131L, FAA, Transport Airplane Directorate, 3229 E. Spring Street, Long Beach, California 90806-2425, telephone (310) 988-5337, fax (310) 988-5210.

SUPPLEMENTARY INFORMATION:

mments Invited

Interested persons are invited to participate in the making of the proposed

le by submitting such written data, views, or arguments as they may desire. munications shall identify the Rules Docket number and be submitted in plicate to the address specified above. All communications received on or before the closing date for comments, specified above, will be considered before taking action on the proposed rule. The proposals contained in this notice may be changed in light of the comments received.

Comments are specifically invited on the overall regulatory, economic, environmental, and energy aspects of the proposed rule. All comments submitted will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested persons. A report summarizing each FAA-public contact concerned with the substance of this proposal will be filed in the Rules Docket.

Commenters wishing the FAA to acknowledge receipt of their comments submitted in response to this notice must submit a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket Number 92-NM-67-AD." The post card will be date stamped and returned to the commenter.

Availability of NPRMs

Any person may obtain a copy of this NPRM by submitting a request to the FAA, Transport Airplane Directorate, ANM-103, Attention: Rules Docket No. 92-NM-67-AD, 1601 Lind Avenue SW., Renton, Washington 98055-4056.

Discussion

On May 3, 1990, the FAA issued AD 89-18-12 R1, Amendment 39-6557 (55 FR 163, March 27, 1990), applicable to certain Boeing and McDonnell Douglas airplanes, to require (1) conversion of all main deck Class B cargo compartments to Class C, or (2) the carriage of all cargo in Class C containers, or (3) the use of individuals trained to fight cargo fires and the installation of certain modifications to the airplane. (Class B and C cargo compartments are defined in 14 CFR 25.857.) That action was prompted by an FAA evaluation of fire protection features of "Combi" airplanes following the loss of a Boeing Model 747-200 Combi that developed a major fire in the main deck Class B cargo compartment. The AD had a two-step compliance program, requiring certain equipment and operational upgrades within one year and more substantial modifications within three years.

After AD 89-18-12 R1 was issued, however, the FAA determined that some of the technical requirements and compliance dates must be re-evaluated based on new information from the FAA Technical Center and unanticipated difficulties encountered by operators in complying with the rule. On April 19, 1991, the FAA issued AD 91-10-02, Amendment 39-6986 (56 FR 20529, May 6, 1991), to supersede AD 89-18-12 R1. AD 91-10-02 was essentially identical to AD 89-18-12 R1, except that it provided relief from the one-year compliance time for some requirements and requested the submittal of comments on all requirements.

AD 91-10-12 was issued through an expedited NPRM process to ensure that relief from certain one-year requirements could be provided prior to the deadline for their compliance, which was May 3, 1991. Because this expedited process would not allow sufficient time for the public to prepare comments on e more extensive three-year requirements, the AD had a provision to ntinue to accept comments on these proposed requirements after the final ule was issued. This proposal is based on those later comments received;

cent test results from the FAA Technical Center; discussions with the ing Commercial Airplane Group and industry representatives; and ordination with airworthiness authorities from other countries.

This rulemaking action proposes to supersede, rather than amend, AD 91-10-02 because the changes being proposed are significant. This proposal would eliminate the option provided in paragraph B.3. of AD 91-10-02, which allowed the use of trained firefighters, in conjunction with an extensive cargo compartment liner, a 15-minute halon fire knock-down system, and other equipment upgrades. That option would be replaced with an option to use blankets/containers for all cargo, and a second option to install an extended halon (or equivalent) fire suppression system. Both of these options would also require certain equipment and operational modifications, including manual firefighting equipment, an upgraded barrier between the cargo and passengers, and upgraded smoke detection. This proposal would also eliminate the requirement for a thermal monitoring system, which was required by both AD 89-18-12 R1 and AD 91-10-02. The one-year requirements of AD 91-10-02 would remain essentially unchanged by this proposal, but the three-year requirements would be significantly different, including an extension of the compliance time.

The following summarizes the background for determining the requirements of the proposed rule and the comments that were received after AD 91-10-02 was issued. All comments received were given due consideration in formulating this proposed rule.

Note: The format of this proposed rule has been restructured to be nsistent with the standard Federal Register style. The main difference in rmatting is the paragraph designations. Whereas the previously issued AD's ed upper case letters to designate major paragraphs (i.e., "A., B., and C."), the new proposal uses lower case letters in parentheses to designate major paragraphs [i.e., "(a), (b), and (c)"]. Throughout the following discussion all references to specific paragraphs that appeared in the previously issued AD's cite the actual paragraph designations that appeared in those AD's; references to paragraphs in the proposed rule use the new paragraph designations.

Discussion of Background and Issues

The FAA issued the original "Combi AD," AD 89-18-12 R1, based on a study after a South African Airways (SAA) 747 Combi accident, which showed that past certification criteria for Combis were inadequate. The requirements of AD 89-18-12 R1 applied to all large transport Combis, with no distinction between wide-body and narrow-body airplanes. That AD was superseded by AD 91-10-02, which also made no such distinction. (As noted previously, AD 91-10-02 was essentially identical to AD 89-18-12 R1, except that it provided relief from some of the one-year compliance requirements and requested the submittal of comments on all requirements of the rule.)

Paragraph B. of AD 91-10-02 offered operators three options for compliance by May 3, 1993. These were: (1) Converting the main deck cargo compartment to Class C; (2) carrying all cargo in Class C containers; or (3) using trained firefighters, in conjunction with design improvements that included a cargo compartment liner and a 15-minute halon knock-down system. Because of the gh cost to convert to a Class C configuration, and the unavailability and flexibility of Class C containers, virtually all Boeing Model 747 Combi operators elected to pursue the third option (paragraph B.3. of AD 91-10-02).

ny of these operators subsequently reported serious concerns about the cost logistics of complying with the paragraph B.3. option. Installation of e cargo compartment liner and the logistics of implementing the requirement for trained firefighters appeared to be the most difficult problems for the operators. Concurrently, test data from the FAA Technical Center indicated that the provisions of the paragraph B.3. option did not provide the level of safety previously predicted. In particular, the FAA and the airworthiness authorities from other countries reconsidered the effectiveness of trained firefighters in many fire situations that could occur on large transport category Combis.

Testing at the FAA Technical Center has demonstrated that there are severe limitations to manual firefighting in the cargo compartment environment. A high level of training, including recurrent training, would be required to effectively prepare firefighters to fight airplane cargo fires. There was a reluctance on the part of the Boeing Model 747 operators in Europe and North America to provide such a training program due to cost, labor, and logistics considerations. Moreover, even a highly trained firefighter would only be effective against very small, accessible fires. Other fires would be likely to grow out of control quickly and compromise flight safety. For these reasons, the concept of using trained firefighters is not being considered in this proposed rule, effectively eliminating the paragraph B.3. option of AD 91-10-02.

Removal of the firefighter option would leave operators with two choices: Converting to Class C or using Class C containers. However, the operators have already found these options to be unworkable. As a result, the FAA began n examine alternative methods of compliance that would provide an acceptable vel of safety. Consequently, two additional options are being offered in is proposed rule: using containers or blankets for all cargo, or installing a 90-minute halon protection system.

Proposed Blanket/Container Option

Testing at the FAA Technical Center and by the United Kingdom Civil Aviation Authority (CAA) has demonstrated that fire-resistant blankets are an effective method of containing cargo fires. These blankets completely cover the cargo, thereby limiting the supply of oxygen to the fire and effectively preventing its growth and spread to other cargo. Testing has demonstrated that blankets can contain a fire for at least three hours, but it is surmised that blankets could contain a fire considerably longer and, in some cases, actually cause it to extinguish. Similar test results have been achieved with fire resistant containers. Based on this information, the FAA has already granted alternative methods of compliance with AD 91-10-02 to some operators in Alaska to use blankets/containers to achieve an acceptable level of safety. An option, similar to the alternative methods of compliance previously granted to certain U.S. operators operating in Alaska, to use blankets/containers has been included in this proposed rule. The paragraph (b)(3) option of this proposed rule stipulates that blankets/containers may be used for all cargo, but also specifies that associated equipment, airplane modifications, and enhanced training must be incorporated if this option is selected. This option omits the requirement for trained firefighters because testing at the FAA Technical Center has shown that attempting to manually ght a fire under a blanket or in a container could introduce oxygen to the re and worsen the situation. The best approach appears to be leaving the ire alone while the airplane diverts and lands, except in the unlikely event

at it breaks out of the blanket or container. However, enhanced training of crew for responding to alarms, and monitoring and controlling fires, uld still be required under this new option. This rulemaking action also proposes to omit the requirement to provide a means to shut off ventilation to the cargo compartment, currently required in the paragraph B.3. option of AD 91-10-02, because blankets and containers effectively provide this function. This option would continue to require an upgraded barrier between the passenger and cargo compartments to prevent flame and smoke penetration into the passenger compartment.

Operators who elect to accomplish the blanket/container option would be required to submit sufficient data to the FAA to show that the devices selected will adequately contain fires. The FAA may require actual full-scale testing, similar to that performed at the FAA Technical Center, to demonstrate fire containment. The tests conducted at the FAA Technical Center to evaluate fire containment ability have involved the use of a cardboard/paper fire load ignited in a container or under a blanket. This test need not be performed on an airplane, however. Operators would also be required to establish FAA-approved procedures for the use and maintenance of the devices, taking into consideration cargo loading procedures and possible degradation during service.

Although AD 91-10-02 made no mention of the use of blankets, the FAA received some comments regarding them. One commenter states that blankets are difficult to maintain, could prevent fire detection, and could hamper firefighting efforts. The FAA recognizes that the nature of some operations may make this option unfeasible, due to damage control and the logistics of nsuring that enough blankets are available at all the appropriate airports. though testing at the FAA Technical Center has shown that blankets can lerate some damage, operators selecting this option would still be required to demonstrate that blankets and containers would be properly maintained.

The FAA concurs that blankets and containers could delay smoke detection, but does not consider that such a delay would be significant. Fires under blankets or in containers would be kept sufficiently small such that they would not pose an immediate threat to the airplane. Additionally, blankets and containers have demonstrated the ability to contain fires for extended periods of time.

The FAA concurs that blankets could hamper firefighting. As previously discussed, testing at the FAA Technical Center has shown that manual intervention of a fire under a blanket or in a container is not advisable. Because blankets and containers have demonstrated successful fire containment, the necessity for manual firefighting is not anticipated, except in the unlikely event that the blanket or container fails to contain the fire. If the blanket/container option is selected, the operator's training program would be required to address this possibility.

Proposed Extended Halon System Option

The FAA recognizes that the blanket/container option may be difficult to implement for some Boeing Model 747 Combi operators in Europe and North America, due to operational and logistical concerns. For this reason, a fourth option, requiring the installation of an extended halon, or equivalent, protection system, has been incorporated in this proposed rule. is option, provided by proposed paragraph (b)(4) of this notice, would quire the installation of a halon extinguishing system that provides 90 minutes of protection, along with additional design and equipment

difications, and training requirements. The additional required ifications would be similar to those required by the paragraph B.3. option AD 91-10-02, except that the extensive liner and the thermal monitoring system requirements would be omitted. The requirement for an upgraded barrier between the passenger and cargo compartments would be retained to prevent flame and smoke penetration into the passenger compartment.

A total of 90 minutes of halon protection was selected for this option based on a survey of current Boeing Model 747 operations in Europe and North America. This survey showed that most existing Combi flights were within 120 minutes of a suitable landing site, and that 90% of flight time was within 90 minutes of a suitable landing site. Upgrading the duration to 120 minutes would impart unreasonable cost, weight, and design penalties on operators of existing airplane designs, particularly in light of the fact that at least 90% of Combi flight time is afforded full halon coverage, and a fire is a rare event. The FAA also recognizes that Combi Class B compartments cannot be easily sealed, due to leakage through the floor. Therefore, in order to obtain 90 minutes of protection, halon must be continuously released into the compartment to account for leakage. To accommodate this, significantly more halon would be required than for sealed areas, such as lower lobe Class C cargo compartments. In the worst case, where the airplane was actually 120 minutes from a suitable landing site, other factors would contribute to the likelihood of a safe landing. First, a halon system certified to provide 3% halon for 90 minutes would continue to provide some protection after the halon decayed below the 3% level. It is also possible that the halon system may extinguish the fire. Rekindling of the fire may not necessarily be instantaneous upon decay of the halon, particularly after 90 minutes, which uld allow cooling of the core. In the case of a self-oxygenating fire, the lon would prevent its spread to adjoining cargo, and it is likely that the source would fully expend long before the 90-minute halon system was depleted. Additionally, in the event that manual intervention was required, the additional firefighting equipment and associated training required as part of this proposal would be in place, and the crew would have 90 minutes to prepare for manual firefighting. The operator's training program would be required to consider this possibility.

As previously stated, the extended halon option would not require the extensive cargo compartment liner required by paragraph B.3. of AD 91-10-02. Instead, operators would be required to install an upgraded barrier between the passenger and cargo compartments, and to ensure that critical systems in the cargo compartment are adequately protected for the period between fire initiation and halon effectiveness. In conjunction with the continuous release of halon into the compartment, this would ensure similar benefits to those provided by the use of an extensive liner. Critical systems of concern include flight controls, electrical wiring, airplane structure, and the windows. Exclusion of critical systems from the cargo compartment, use of protective covers, and separation of critical components are methods of providing critical system protection.

The FAA recognizes that some critical systems could remain exposed in the compartment because of their inherent ability to withstand fire conditions, or due to other factors, such as their location in the compartment. In evaluating the methods used by operators who elect this proposed option, the FAA will use the requirements of FAR 25, Appendix F, Part III (Amdt. 25-60) evaluate the adequacy of protective covers and exposed systems, unless re suitable criteria, such as test data from the FAA Technical Center, can be justified and approved by the FAA. Testing at the FAA Technical Center has

own that flames can break out and that fires can grow rapidly within ents of smoke detection. Because of this, a five-minute exposure period to re will be assumed in assessing protective features. This five-minute criterion is based on a conservative estimate of the time required to manually confirm the fire after alarm, inform the flight deck, initiate ventilation shut-down and halon release, and for the halon to reach an effective concentration. If five minutes of protection cannot be adequately demonstrated, the FAA may require automatic ventilation shut-down and halon release on alarm, or the installation of a second detection means in the compartment to eliminate the time required to manually confirm the fire.

Proposed Omission of Method to Discharge Extinguishers in Containers

Several commenters recommend that the requirement of paragraph B.3.h. of AD 91-10-02 to provide a method to safely discharge extinguishers into containers be eliminated because no such means currently exists. The FAA concurs, based on FAA Technical Center results that indicate fighting fires in containers or under blankets could actually intensify the fire, and the fact that the options being offered in the proposed rule no longer rely on manual firefighting. The proposed rule reflects this.

Proposed Omission of Thermal Monitoring System Requirement

The firefighter option, provided by paragraph B.3. of AD 91-10-02, required the installation of a thermal monitoring system as a second means of fire detection over the existing smoke detection system. The FAA considered ntinuing to require the thermal monitoring system in this proposed rule, t determined that it should not be included. The FAA considers that the limited benefit of adding the thermal monitoring system does not justify its high cost for either the blanket/container option or the extended halon option.

The requirement for a thermal monitoring system first appeared in the original Combi AD, AD 89-18-12 R1, as part of the firefighter option. Two different roles for the system were envisioned. One role of the system was to complement the existing smoke detectors to ensure the earliest possible warning, recognizing that any delay in detection could allow the fire to grow beyond the limited capabilities of the trained firefighter. Of particular concern were deep-seated and low smoke fires. The other role was to provide compartment temperature information to aid in deciding whether to expend the 15-minute halon knock-down system, required under that option, immediately or to attempt to manually fight the fire first. In either case, the requirement for the thermal monitoring system was closely associated with the use of trained firefighters. Since the new options offered in this proposed rule do not rely on trained firefighters, the requirement for a thermal monitoring system is unnecessary.

The FAA's justification for omitting the thermal monitoring system from the paragraph (b)(3) option of this proposed rule is that blankets/containers have demonstrated containment of fires for long time periods. Although smoke detection could be delayed, the contained fire would not be immediately threatening to the airplane, and any minor delay in detection would not prevent a safe diversion to the nearest suitable airport. In addition, mited testing at the FAA Technical Center using blankets has shown that the fference between detection times for smoke detection and infrared-based thermal monitoring systems is insignificant.

The FAA's justification for not requiring a thermal monitoring system for extended halon option provided by paragraph (b)(4) of this proposed rule that this option is similar to a Class C compartment, since both rely on the use of halon for fire control. The main difference between the extended halon option and an actual Class C compartment is that a Class C compartment requires a full liner and halon protection for the maximum diversion flight time. The role of the liner in Class C compartments is to contain the halon, such that a sufficient concentration is maintained, and to protect local systems prior to halon effectiveness. Although the option provided by proposed paragraph (b)(4) would not require this liner, it would provide the benefits of the liner. Halon concentration would be maintained for 90 minutes. This would probably require continuous release of halon into the compartment to ensure adequate concentration due to leakage. Operators would also be required to demonstrate adequate protection of critical systems, as previously discussed. The extended halon option of proposed paragraph (b)(4) therefore would provide a similar level of safety to a Class C compartment for 90 minutes. Smoke detectors alone have demonstrated acceptable performance in the past for Class C compartments. In addition, testing at the FAA Technical Center has shown that the difference between the time a fire in a polyethylene covered pallet is detected by a thermal detector and the time it is detected by a smoke detector is insignificant. Therefore, a thermal monitoring system is not necessary for the proposed paragraph (b)(4) option.

The FAA received several comments regarding the specific design of thermal monitoring systems. These comments have been addressed, below, from a general standpoint, although the thermal monitoring system requirement has been removed from the proposed rule.

One commenter recommends that threshold temperatures for the thermal monitor should be established just above the maximum expected ambient temperature, which is 160 degrees Fahrenheit. The commenter indicates that a lower threshold could be established, while preventing false alarms, by monitoring the rate of temperature rise and integrating the thermal monitoring system with smoke detection. The FAA concurs that providing the earliest detection with minimal false alarms for any fire detection system is ideal, and that monitoring the rate of temperature rise could play a role in obtaining earlier detection. Integrating a thermal monitoring system with the smoke detection possibly could provide earlier detection and minimize false alarms, although the FAA has no data to indicate that smoke detection systems alone are inadequate.

Proposed Omission of Extensive Liner Requirement

The paragraph B.3. option of AD 91-10-02 required the installation of an extensive cargo compartment liner. Under that option, the liner would have been required on all surfaces of the cargo compartment, with the exception of the floor. The intent of the requirement was to protect the critical systems and structure of the airplane until the trained firefighter was able to effectively control and extinguish the fire. The FAA received numerous comments concerning the severe cost and limited benefit of the extensive liner.

This rulemaking action proposes to remove the paragraph B.3. option, due to concerns about the effectiveness of manual firefighting, as previously discussed. That option would be replaced with two options: (1) The use of blankets/containers for all cargo, or (2) the installation of a 90-minute halon protection system. The FAA considered the cost to operators of existing

mbi airplane designs in formulating the new options. The FAA considered tinuing to require the extensive cargo compartment liner for the new cions being proposed, but determined that such a liner is unnecessary. A liner would have two roles: Containment of the fire until it is controlled, and containment of halon, if required (usually applies to lower lobe Class C compartments). FAA Technical Center testing has demonstrated that blankets/containers can effectively contain and control cargo fires, eliminating the need for a liner when these devices are used. The FAA considers that the extensive liner would not be necessary for the extended halon option, provided that critical systems and structure are protected for the period prior to halon effectiveness, and sufficient halon concentration is maintained in the compartment through continuous halon release.

Single Rule Approach for Wide-Body and Narrow-Body Airplanes

Two commenters to AD 91-10-02 recommend that separate AD's be prepared: One for wide-body airplanes and another for narrow-body airplanes. The FAA disagrees. The threat of an uncontrolled fire is equivalent for both types of airplanes. The FAA recognizes that the solutions may differ based on size of the airplane. However, airline route structure will also have an impact on the design. For instance, the design solution for wide-body Combis involved in long over-water flights would differ significantly from the same airplanes used on shorter route structures. It is impractical to address each operator's unique circumstance in this AD or through a collection of AD's, due to the varied airplane types and route structures. The FAA considers that he case with the most significant impact, from a design standpoint, is the e of wide-body airplanes on long route structures, such as some of the ropean and North American Boeing 747 Combi operations. The details of this proposed rule are based on this case, recognizing that the options being provided would ensure adequate safety for all Combi operations. The FAA fully understands that an alternative for some of the requirements, such as a reduction in the quantities of halon or protective breathing specified in this proposal, could be justified for some operators, such as short-range narrow-body airplane operators in Alaska. Operators who can demonstrate that full compliance with the specific requirements of this proposed rule is not necessary in order to ensure adequate safety are encouraged to apply for approval of alternative methods of compliance with the proposed rule, as provided for by paragraph (d).

Proposed Change to Preflight Inspection Requirement

Several commenters recommend that a person other than the flight deck crewmember or firefighter be permitted to perform the preflight inspection of the cargo compartment required by paragraphs A. and B. of AD 89-18-12 R1 and AD 91-10-02. The FAA concurs. The intent of that requirement was to ensure that proper access was provided for manual firefighting and to provide a general familiarization with the type and layout of cargo in the compartment. This inspection was, in no manner, intended to relieve the pilot of his/her responsibility to ensure proper operation of the airplane, as required by FAR 91.3. Although the trained firefighter option has been eliminated from this proposed rule, the proposal retains the preflight inspection requirement for miliarization only, and includes an additional requirement for a crewmember be assigned "firefighting" duties for each flight. Operators would be required to ensure that crewmembers assigned firefighting duties have

ceived adequate training in performing preflight inspections, responding to rms, and monitoring and controlling cargo compartment fires, based on the cion selected. The preflight inspection would ensure a first hand knowledge of the cargo layout in the compartment in the event that a fire occurred. The intent of this inspection is not to verify correct loading of the compartment per the loading placards. The FAA intends this preflight inspection to be performed by the crewmember who has been assigned "firefighter" duties for the flight and who has received appropriate training as specified in this proposed rule. This crewmember would not necessarily need to be a member of the flight crew. As stated previously, however, this preflight inspection is not intended to relieve the pilot of responsibilities in accordance with FAR 91.3. The proposed rule reflects this.

Requirement for One-Minute Smoke Detection

AD 91-10-02 required that smoke detectors be upgraded to the one-minute detection criteria of FAR 25.858 (Amendment 25-54). This would continue to be required in this proposed rule. One commenter recommends that the criteria for smoke detection be an average detection time under 70 seconds with maximum allowable excursions to 100 seconds, in order to decrease the likelihood of false alarms. This commenter also proposes that smoke generation during testing continue beyond 60 seconds until smoke detection occurs. Approval of the commenter's proposal is not within the scope of this rulemaking action because it would impact future certification of all smoke detection systems. However, the FAA is currently in the process of evaluating his proposal, independent of this AD action.

The FAA recognizes that some existing smoke detection systems installed on der airplanes, which do not necessarily meet the FAR 25.858 one-minute detection criteria, may be adequate for the purposes of this proposed rule, particularly in light of the new options being proposed and the significant cost of implementing one-minute smoke detection systems on older airplanes. These older systems were certificated to the older FAA five-minute detection criteria. The FAA recognizes that, although certain systems may have been certificated to the five-minute criteria, they actually perform significantly better than the five-minute requirement. For instance, the FAA has reviewed Model 747-100/-200/-300 Combi certification test data, and determined that the existing smoke detection systems on those airplanes typically alarm within two minutes, and that most detections occur in a considerably shorter period of time. Detection delays would be most appreciable in small fires that produce little smoke, which are not immediately threatening to the airplane. Very little delay would occur in detection of the most threatening fires, which are those that erupt violently and grow quickly. The FAA would consider approving as alternative methods of compliance those existing smoke detection systems on older airplanes, which may not meet the FAR 25.858 one-minute detection criteria, if these systems have demonstrated sufficient early detection in testing and in service.

Proposed Increase in Protective Breathing/Garment Quantities

This rulemaking action also proposes to modify the quantity requirements for protective garments and protective breathing equipment (PBE). AD 91-10-02 es not specify a quantity of protective garments. This proposed rule ecifies two sets of garments, which would provide for two persons to enter the compartment for manual firefighting. This proposed rule also would

crease the amount of PBE protection required from 30 minutes to 30 minutes for two persons, plus an additional quantity of 90 minutes of PBE for one person, in order to allow for continuous monitoring of the compartment after alarm until the airplane has landed safely. This proposed rule would require that all PBE and protective garments be located outside the cargo compartment.

Proposed Change in Illumination Criteria

Several commenters recommend the use of the Boeing Model 747-400 Combi sidewall lighting configuration to meet the illumination requirement of paragraph B.3.f. of AD 91-10-02. The FAA concurs that the Model 747-400 lighting configuration is adequate, and the proposed rule reflects Model 747-400 lighting data. The FAA recognizes that the lighting requirement was included in the existing Combi AD as an integral part of the firefighter option. Because that option has been removed from this proposed rule, the lighting requirements for the blanket/container and extended halon options have been revised to allow for qualitative acceptance of existing lighting on older airplanes as the FAA determines to be appropriate on a case-by-case basis. The FAA also recognizes that tactile or low level lighting markers could be used to identify pathways in lieu of pathway lighting. Such methods will be evaluated by the FAA through alternative methods of compliance requests. (Pathways include longitudinal and cross aisles.) One commenter suggests that the lighting criteria of paragraph B.3.f. of AD 91-10-02 would increase the risk of fire in the cargo compartment. The FAA has no data to support this. The proposed rule also provides for a qualitative evaluation of existing systems to determine if they are adequate to meet the intent of the requirement.

Proposed Extension of Compliance Time

Several commenters request extensions of compliance times for various requirements of paragraph B. of AD 91-10-02. The FAA concurs that it is unrealistic to require full compliance by May 3, 1993, for the requirements of paragraph B. of the existing AD, particularly in light of the significant changes which are being proposed in this action. These commenters also recommend that compliance dates be coordinated with the Joint Airworthiness Authorities (JAA), since this rulemaking action has a worldwide impact. The FAA concurs and has been coordinating all portions of this proposed rule with the JAA and Transport Canada Aviation. This action proposes to extend the compliance period for these requirements [specified in paragraph (b) of this proposed rule] by approximately two years.

Other Issues

Several commenters recommend that cargo accessibility could be adequately demonstrated in a ground test, rather than a flight test. The FAA concurs, and the proposed rule reflects this.

One commenter recommends the removal of the Model DC-9-80 series airplanes from the applicability of the rule because these airplanes do not have certified main deck cargo compartments. The FAA concurs and the proposed rule reflects this.

One commenter requests that the individual airline's safety record for cargo handling be taken into account in establishing requirements. The FAA

rees with the commenter, but such a provision in the proposed rule is practical. In the past, the FAA has taken airline safety records, as well airplane size and airline route structure, into account in granting alternative methods of compliance with AD 89-18-12 R1. The FAA will continue to recognize that the specific requirements of this proposed rule can be "tailored," based on the individual circumstances of each operator, through requests for approval of alternative methods of compliance.

One commenter disagrees with relaxation of the requirements of AD 91-10-02 for economic reasons. The FAA concurs. Although significant changes are being proposed in this rulemaking action, the options being presented have been determined to provide a greater level of safety than those specified in AD 91-10-02. These options have the additional benefit of being more acceptable to the affected operators from both economic and operational standpoints.

One commenter states that crew notification of a fire is one of the most important safety measures. The FAA concurs with the comment, and considers that the options being offered in this proposed rule ensure adequate crew notification.

Cost Impact

There are approximately 278 Boeing Models 707, 727, 737, 747, and 757 series airplanes and 124 McDonnell Douglas Model DC-8, DC-9, and DC-10 series airplanes of the affected design in the worldwide fleet. It is estimated that approximately 80 Boeing Model 707, 727, 737, 747, and 757 series airplanes, and 79 McDonnell Douglas Model DC-8, DC-9, and DC-10 series airplanes, of U.S. registry have been certificated to operate with a Class B main deck cargo compartment. Many of these airplanes are operated permanently in the all-passenger configuration and are, therefore, not affected by this rule. Approximately 40 of these airplanes, currently operated by U.S. operators in the mixed cargo/passenger configuration, are affected by this amendment.

The design alternative selected by the operator and the type of airplane will have a significant impact on the cost of complying with this AD. The highest cost option is expected to be the conversion to a Class C compartment, as defined in paragraph (b)(1) of this proposal.

A conservative cost estimate for incorporating the extended halon option into Boeing Model 747 airplanes, based upon costs of required materials, labor, and testing, is $2,000,000 per airplane. A conservative estimate for incorporating the blanket/container option on Boeing Model 747 airplanes, based upon the costs of required materials, labor, and testing, is $200,000.

The FAA is not aware of any U.S. Model 747 Combi operators. Most U.S.-registered Combis are Boeing Models 727 and 737 airplanes operated in Alaska. The FAA has granted these operators alternative methods of compliance with AD 89-18-12 R1 in the past. These alternative methods of compliance are acceptable to meet the intent of this proposed rulemaking action. Therefore, this proposed rulemaking should incur no additional cost on U.S operators.

Regulatory Impact

The regulations proposed herein would not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this proposal would not have sufficient federalism implications to warrant the preparation of a Federalism

sessment.
For the reasons discussed above, I certify that this proposed regulation (1) is not a "major rule" under Executive Order 12291; (2) is not a "significant rule" under the DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and (3) if promulgated, will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. A copy of the draft regulatory evaluation prepared for this action is contained in the Rules Docket. A copy of it may be obtained by contacting the Rules Docket at the location provided under the caption " ADDRESSES. "

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Safety.

The Proposed Amendment

Accordingly, pursuant to the authority delegated to me by the Administrator, the Federal Aviation Administration proposes to amend 14 CFR part 39 of the Federal Aviation Regulations as follows:

PART 39--AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. App. 1354(a), 1421 and 1423; 49 U.S.C. 106(g); and 14 CFR 11.89.

Sec. 39.13 [Amended]

2. Section 39.13 is amended by removing Amendment 39-6986 (56 FR 20529, May 6, 1991) and by adding a new airworthiness directive (AD), to read as follows:

Boeing and McDonnell Douglas: Docket No. 92-NM-67-AD. Supersedes AD 91-10-02, Amendment 39-6986.

Applicability: Boeing Models 707, 727, 737, 747, and 757 series airplanes and McDonnell Douglas Models DC-8, DC-9, and DC-10 series airplanes; equipped with a main deck Class B cargo compartment, as defined by Federal Aviation Regulations (FAR) 25.857(b) or its predecessors, with a volume exceeding 200 cubic feet; certificated in any category.

Compliance: Required as indicated, unless accomplished previously. To minimize the hazard associated with a main deck Class B cargo compartment fire, accomplish the following:

(a) Within one year after May 3, 1990 (the effective date of Amendment 39-6557, AD 89-18-12 R1), or prior to carrying cargo in a Class B cargo compartment, whichever occurs later, accomplish the following in accordance with the appropriate technical data approved by the Manager, Seattle Aircraft Certification Office (for Boeing series airplanes), FAA, Transport Airplane Directorate; or the Manager, Los Angeles Aircraft Certification Office (for McDonnell Douglas series airplanes), FAA, Transport Airplane Directorate:

(1) Revise the Limitations Section of the FAA-approved Airplane Flight Manual (AFM) to include the following:

FOR EACH FLIGHT IN WHICH CARGO IS TRANSPORTED IN THE CLASS B CARGO COMPARTMENT: Prior to flight, a flight deck crewmember must make a visual inspection throughout the Class B cargo compartment to verify access to cargo and the general fire security of the compartment after the cargo door is closed and secured."

Note: This visual inspection is in no manner intended to relieve the pilot of his/her responsibility to ensure safe operation of the airplane, as required by FAR 91.3.

(2) Incorporate the following systems and equipment:

(i) Provide a minimum of 48 lbs. Halon 1211 fire extinguishant, or its equivalent, in portable fire extinguisher bottles readily available for use in the cargo compartment. At least two bottles must be a minimum of 16 lb. capacity.

(ii) Provide at least two Underwriters Laboratories (UL)2A (2-12 gallon) rated water portable fire extinguishers, or its equivalent, adjacent to the cargo compartment entrance for use in the compartment.

(iii) Provide a means for two-way communication between the flight deck and the interior of the cargo compartment.

(iv) Install placards in conspicuous place(s) within the cargo compartment clearly defining the cargo loading envelope and limitations that provide sufficient access of sufficient width for firefighting along the entire length of at least two sides of a loaded pallet or container. Amend the appropriate Weight and Balance and loading instructions by description and diagrams to include this information.

(3) Incorporate the following systems and equipment:

(i) Provide appropriate protective garments stored adjacent to the cargo compartment entrance.

(ii) Provide a minimum of 30 minutes of protective breathing. This equipment must meet the requirements of Technical Standard Order (TSO) C-116, Action Notice 8150.2A, or equivalent, and be stored adjacent to the cargo compartment entrance.

(b) Within thirty months after the effective date of this AD, or prior to carrying cargo in a Class B cargo compartment, whichever occurs later, accomplish the requirements of paragraph (b)(1), (b)(2), (b)(3), or (b)(4) of this AD:

(1) Option 1: Modify the Class B cargo compartment to comply with the requirements for a Class C cargo compartment, as defined in FAR 25.855 (Amdt. 25-60), 25.857(c), and 25.858 (Amdt. 25-54).

(2) Option 2: Modify all main deck Class B cargo compartments to require the following placard installed in conspicuous locations approved by the Manager, Seattle Aircraft Certification Office, FAA, Transport Airplane Directorate (for Boeing airplanes), or the Manager, Los Angeles Aircraft Certification Office, FAA, Transport Airplane Directorate (for McDonnell Douglas airplanes), throughout the compartment:

"Cargo carried in this compartment must be loaded in an approved flame penetration-resistant container meeting the requirements of FAR 25.857(c) with ceiling and sidewall liners and floor panels that meet the requirements of FAR 25, Appendix F, Part III, (Amdt. 25-60)."

(3) Option 3: In addition to the requirements of paragraph (a)(2) of this

), accomplish the following in accordance with technical data approved by Manager, Seattle Aircraft Certification Office (for affected Boeing ies airplanes), or the Manager, Los Angeles Aircraft Certification Office (for affected McDonnell Douglas series airplanes):

(i) Carriage of all cargo in Class B cargo compartments must meet the requirements of (b)(3)(i)(A) or (b)(3)(i)(B) of this AD:

(A) Cover cargo with fire containment covers (FCC).

(B) Carry cargo in fire containment containers.

(ii) Provide a smoke or fire detection system in the Class B cargo compartment that meets the requirements of FAR 25.858 (Amdt. 25-54) and also provides an aural and visual warning to the crewmembers in the passenger compartment.

(iii) Provide a barrier between the Class B cargo compartment and the passenger compartment to prevent the penetration of smoke or flames from the cargo compartment into the passenger compartment. The barrier must extend from the cargo compartment floor to the upper crown area of the fuselage, and from the right sidewall to the left sidewall of the cargo compartment, completely isolating the cargo compartment from the passenger compartment. The barrier and associated seals/interfaces must meet the requirements of FAR 25, Appendix F, Part III (Amdt. 25-60).

(iv) Provide illumination of the Class B cargo compartment as specified in paragraphs (b)(3)(iv)(A) and (b)(3)(iv)(B) of this AD:

(A) General area illumination of the cargo with an average illumination of 0.1 foot-candle measured at 40-inch intervals both at one-half the pallet or container height, and at the full pallet or container height, or as approved by the FAA.

(B) Illumination of the longitudinal access pathways, required by paragraph )(2)(iv) of this AD, with an average illumination of 5 foot-candles when measured at 40 inch intervals along a line that is within 2 inches of and parallel to the floor centered on the pathway, or illumination under visibility conditions likely to occur in the cargo compartment in the event of a fire.

(v) Establish FAA-approved procedures and training as specified in paragraphs (b)(3)(v)(A) and (b)(3)(v)(B) of this AD:

(A) Use and maintenance of items required by paragraph (b)(3)(i).

(B) Responding to alarms, and monitoring and controlling Class B cargo compartment fires.

(vi) Provide a viewport into the Class B cargo compartment from the passenger compartment. The viewport must be located such that a crewmember can readily identify the overall smoke conditions in the compartment prior to entering it.

(vii) Demonstrate the following features and functions, specified in paragraphs (b)(3)(vii)(A), (b)(3)(vii)(B), and (b)(3)(vii)(C) of this AD:

(A) Smoke or Fire Detection System, required by paragraph (b)(3)(ii) of this AD, by flight test.

(B) Prevention of smoke penetration into occupied compartments [Refer to FAR 25.857(b)(2) and 25.855(e)(2).], by flight test.

(C) Cargo accessibility, as specified in paragraph (a)(2)(iv) of this AD.

(viii) Provide the following systems and equipment:

(A) Provide appropriate protective garments for two persons stored in the passenger compartment, adjacent to the Class B cargo compartment entrance.

(B) Provide a minimum of 120 minutes of protective breathing for one rson, and an additional 30 minutes of protective breathing for an additional person. This equipment must meet the requirements of Technical

tandard Order (TSO) C-116, Action Notice 8150.2A, or equivalent, and at st 30 minutes of the total protective breathing must be stored adjacent to e Class B cargo compartment entrance. All protective breathing equipment must be located outside the cargo compartment.

(ix) Revise the Limitations Section of the FAA-approved Airplane Flight Manual (AFM) to include the following:

"FOR EACH FLIGHT IN WHICH CARGO IS TRANSPORTED IN THE CLASS B CARGO COMPARTMENT: Prior to flight, a crewmember who is assigned firefighting responsibility for the flight must make a visual inspection throughout the Class B cargo compartment for familiarization, after the cargo door is closed and secured."

Note: This visual inspection is in no manner intended to relieve the pilot of his/her responsibility to ensure safe operation of the airplane, as required by FAR 91.3.

(4) Option 4: In addition to the requirements of paragraph (a)(2) of this AD, accomplish the following in accordance with technical data approved by the Manager, Seattle Aircraft Certification Office (for affected Boeing series airplanes), or the Manager, Los Angeles Aircraft Certification Office (for affected McDonnell Douglas series airplanes):

(i) Provide a cargo compartment fire extinguishing system in the Class B cargo compartment that provides an initial fire extinguishant concentration of at least 5 percent of the empty compartment volume of Halon 1301 or quivalent, and a fire suppression extinguishant concentration of at least 3 rcent of the empty compartment volume of Halon 1301 or equivalent, for a riod of time not less than 90 minutes.

(ii) Provide a smoke or fire detection system in the Class B cargo compartment that meets the requirements of FAR 25.858 (Amdt. 25-4) and also provides an aural and visual warning to the crewmembers in the passenger compartment.

(iii) Provide a means from the flight deck to shut off ventilation system inflow to the Class B cargo compartment.

(iv) Provide a barrier between the Class B cargo compartment and the passenger compartment to prevent the penetration of smoke or flames from the cargo compartment into the passenger compartment. The barrier must extend from the cargo compartment floor to the upper crown area of the fuselage, and from the right sidewall to the left sidewall of the cargo compartment, completely isolating the cargo compartment from the passenger compartment. The barrier and associated seals/interfaces must meet the requirements of FAR 25, Appendix F, Part III (Amdt. 25-60).

(v) Provide appropriate protection of the cockpit voice and flight data recorders, and all systems or components required for safe flight and landing of the airplane, unless it can be demonstrated that these systems are not susceptible to damage in the event of a fire in the Class B cargo compartment.

(vi) Provide illumination of the Class B cargo compartment as specified in paragraphs (b)(4)(vi)(A) and (b)(4)(vi)(B) of this AD:

(A) General area illumination of the cargo with an average illumination of 0.1 foot-candle measured at 40-inch intervals both at one-half the pallet or ntainer height, and at the full pallet or container height, or as approved the FAA.

(B) Illumination of the longitudinal access pathways, required by paragraph

(b)(iv) of this AD, with an average illumination of 5 foot-candles when measured at 40 inch intervals along a line that is within 2 inches of and parallel to the floor centered on the pathway, or illumination under visibility conditions likely to occur in the cargo compartment in the event of a fire, as approved by the FAA.

(vii) Establish FAA-approved procedures and training for responding to alarms, and monitoring and controlling cargo compartment fires.

(viii) Provide a viewport into the Class B cargo compartment from the passenger compartment. The viewport must be located such that a crewmember can readily identify the overall smoke conditions in the compartment prior to entering it.

(ix) Demonstrate the following features and functions:

(A) Fire extinguishant concentration, required by paragraph (b)(4)(i) of this AD, by flight test.

(B) Smoke or fire detection system, required by paragraph (b)(4)(ii) of this AD, by flight test.

(C) Prevention of smoke penetration into occupied compartments [Refer to FAR 25.857(b)2 and 25.855(e)2.], demonstrated by flight test.

(D) Cargo accessibility, as specified in paragraph (a)(2)(iv) of this AD.

(x) Provide the following systems and equipment:

(A) Provide appropriate protective garments for two persons stored in the passenger compartment, adjacent to the Class B cargo compartment entrance.

(B) Provide a minimum of 120 minutes of protective breathing for one person, and an additional 30 minutes of protective breathing for an additional person. This equipment must meet the requirements of Technical Standard Order (TSO) C-16, Action Notice 8150.2A, or equivalent, and at least minutes of the total protective breathing must be stored adjacent to the Class B cargo compartment entrance. All protective breathing equipment must be located outside the cargo compartment.

(xi) Revise the Limitations Section of the FAA-approved Airplane Flight Manual (AFM) to include the following statement:

"FOR EACH FLIGHT IN WHICH CARGO IS TRANSPORTED IN THE CLASS B CARGO COMPARTMENT: Prior to flight, a crewmember who is assigned firefighting responsibility for the flight must make a visual inspection throughout the Class B cargo compartment for familiarization, after the cargo door is closed and secured."

Note: This visual inspection is in no manner intended to relieve the pilot of his/her responsibility to ensure safe operation of the airplane, as required by FAR 91.3.

(c) Compliance with paragraphs (b)(1) or (b)(2) of this AD constitutes terminating action for the requirements of paragraph (a) of this AD. Compliance with paragraphs (b)(3) or (b)(4) of this AD constitutes terminating action for the requirements of paragraphs (a)(1) and (a)(3) of this AD.

(d) An alternative method of compliance or adjustment of the compliance time, which provides an acceptable level of safety, may be used when approved by the Manager, Seattle Aircraft Certification Office (ACO), FAA, Transport Airplane Directorate (for Boeing series airplanes); or the Manager, Los Angeles Aircraft Certification Office (ACO), FAA, Transport Airplane Directorate (for McDonnell Douglas series airplanes). Operators shall submit their requests through an appropriate FAA Principal Maintenance Inspector, who may concur or comment and then send it to the Manager of the Seattle ACO,

the Manager of the Los Angeles ACO, as appropriate.

Note: Alternative methods of compliance previously granted for Amendment 39-557, AD 89-18-12 R1; or Amendment 39-7986, AD 91-20-02; continue to be considered as acceptable alternative methods of compliance for this amendment. ← F.R.

(e) Special flight permits may be issued in accordance with FAR 21.197 and 21.199 to operate the airplane to a location where the requirements of this AD can be accomplished.

Issued in Renton, Washington, on July 21, 1992.

Darrell M. Pederson,

Acting Manager, Transport Airplane Directorate, Aircraft Certification Service.

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