



**Aging Aircraft Program
Supplemental Structural Inspection
Document (SSID) Review**

-Final Report-

September 2001

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Executive Summary

This report describes the activities of a Team that was chartered to gain knowledge of the damage tolerance based inspection aspects of the Aging Aircraft Programs and to make recommendations regarding how the FAA should handle the Supplemental Structural Inspection Document (SSID) Airworthiness Directives (ADs). During phase I, the team addressed the Boeing 727/737, MD-80, and McDonnell Douglas heritage model airplanes, and made recommendations regarding the differences in the treatment of repairs and modifications in the respective SSID Airworthiness Directives (AD). During phase II, the team addressed the remaining 6 model aging aircraft (Boeing 707/720, Fokker F-28, Lockheed L-1011, BAe 1-11, Airbus A300, and CASA C-212), and made recommendations for changes that should be incorporated into these remaining SSID ADs.

This report also describes the process used to develop recommendations that are intended to standardize the repair and modification instructions in the SSID AD's. Recommendations for both phase I and phase II are listed in this report with a justification provided for each. A Generic SSID AD implementing the recommendations for repairs and modifications are provided in this report to illustrate how standardized instructions and compliance times could be incorporated into AD format.

Introduction:

This report is the product of a team that was chartered by the ANM-110 and Aging Aircraft Program Managers. From this point on this team will be referred to as the “Team”. The Team was chartered to obtain a fundamental understanding of the damage tolerance based inspection aspects of the Aging Aircraft Programs and to make recommendations in the following two phases of activities. Phase I of the Team’s charter is defined as follows:

1. Recommend a course of action to address the current differences in the treatment of repairs and modifications (especially STC’s) installed both before and after the effective dates of the AD’s for the 727/737 models and DC-8, DC-9, and DC-10 models. Also recommend a course of action for treatment of the draft MD-80 SSID NPRM prepared by the LAACO. If the team’s recommendation is that the mandated programs for these models should be different, the team should provide full explanations and justification for the differences.
2. The team should also determine, in consideration of the general rulemaking, whether changes to the AD’s that mandate SSID programs are necessary.

Phase II of the Team’s charter consists of the following activities:

1. Recommend how the FAA should handle SSID AD’s on all of the 11 model aging aircraft (Boeing, Douglas, Lockheed, Airbus, Fokker, CASA, and British Aerospace). If the team’s recommendation is that the mandated programs for the eleven Aging Aircraft models should be different, the team should provide full explanations and justification for the differences.

It’s important to note that CASA was not identified in the SSID Team Charter as being one of the aging model aircraft. However, the Team became aware that CASA had produced a SSID document for the C-212, which had been subsequently mandated by a FAA AD. Therefore, during Phase II the Team gathered information on the CASA C-212 SSID and FAA AD, then evaluated them along with the other aging aircraft. The addition of CASA resulted in the Team evaluating a total of 12 aging aircraft models during both Phase I and Phase II.

Even though the Team reviewed the basic Boeing and Douglas SSID programs during the Phase I activities, the Team focused on the difference in the AD mandated implementation of the two basic programs, primarily in the areas of repairs, alterations and STC modifications. The details about the process and activities that the Team took in order to establish recommendations are in the Discussion section of this report.

The Team’s recommendations and justification for the recommendations for both phase I, and phase II of the Team’s review are provided in the Recommendations section of this report. The appendices of this report contain several tools that the Team developed and used to establish the Team’s recommendations. The Appendix section also contains a Generic AD that demonstrates how the Team’s recommendations can be implemented into a standardized AD.

List of Acronyms and Definitions:

CPCP	Corrosion Prevention and Control Program (Reference Appendix K for details of this program)
DGAC	Dirección General de Aviación Civil (The Spanish Airworthiness Authorities responsible for the State of Design for CASA)
DGAC	(The French Airworthiness Authorities responsible for the State of Design for Airbus)
DSG	Design Service Goal
PSE	Principal Structural Element
RAP	Repair Assessment Program (Reference Appendix K for details of this program)
RLD	Rijksluchtvaartdienst (The Netherlands Airworthiness Authority responsible for the State of Design for Fokker)
SID	Supplemental Inspection Document-Sometimes the Acronym SID is interchanged with SSID
SIP	Structural Integrity Program
SRP	Sampling Rotational Program
SSID	Supplemental Structural Inspection Document-Sometimes the Acronym SSID is interchanged with SID
SSD	Structurally Significant Detail
SSI	Structurally Significant Items

Phase I Discussion:

The process used to develop the recommendations intended to standardize the repairs and modifications paragraphs of the SSID/SID AD's, where necessary, took several meetings and telecons over a period of five months. Prior to making any recommendations, the Team conducted interviews with FAA engineers, FAA national resource specialist, FAA aging aircraft program manager; FAA aircraft evaluation group, FAA legal counsel, Boeing north engineers; Boeing Long Beach engineers (MDC), and engineers from an airline operator (who requested to remain anonymous). The interviews were conducted in person when feasible and by telephone when time and distance was an obstacle. These interviews helped the Team to gain a fundamental understanding of the basic SSID/SID programs and the AD's that mandate them. Detailed notes from these interviews are located in Appendix D of this report.

The Team met several times in both Los Angeles and in Seattle to conduct the review of the SSID/SID AD's and their differences. During these meetings the Team developed several tools to assist in the decision making process. One tool that was developed was a table comparing the 727/737 AD's and MD-80 draft NPRM paragraphs related to repairs, alterations and STC modifications. This comparison table was used throughout the review and can be found in Appendix E of this report. The comparison table was used to assist the Team in identifying and listing the differences between the 727/737 AD's and the MD-80 draft AD. From this list of differences, the Team identified and created a table of advantages and disadvantages based on the information gained from the interviews. The table of advantages and disadvantages was used to identify what worked well from each AD. The table of advantages and disadvantages is located in Appendix F of this report. This table was used in the formulation of the Team's recommendations.

A Generic SSID/SID AD implementing the Team's recommendations was drafted to assist in illustrating the recommendations and was used as a tool to ensure the recommendations could be implemented in AD format. The Generic AD paragraphs were limited to those with requirements for inspection program revisions related to repairs and modifications. The development of the Generic AD helped the Team to fine-tune the final recommendations. The Team recognizes that the 727/737 AD's and MDC SID AD's will continue to be different in the areas where the basic SSID/SID inspection requirements are specified. However, for repairs and modifications, the SSID/SID AD's may use the standardized compliance time in the Generic AD. The Generic SSID/SID AD is located in Appendix G of this report.

The Team is in concurrence with 8 final recommendations resulting from the evaluation of the 727/737 and MDC SSID/SID AD's. In parallel with the development of the Generic SSID/SID AD, the Team looked at each recommendation in detail and provided a rational justification for each recommendation.

A summary of each of the aging aircraft initiatives is included in Appendix K of this report. The aging aircraft initiatives include the Repair Assessment Program, Widespread Fatigue Damage, Aging Airplane Safety Initiative, Corrosion Prevention and

Control Program, and Supplemental Structural Inspection Programs. It was important for the team to become familiar with these initiatives, since some of them have requirements which can overlap the SID requirements

Phase I List of Recommendations:

The following is a list of recommendations that the Team concurs should be considered for revision of the Boeing 727/737 and McDonnell Douglas heritage model airplanes SSID/SID AD's.

Recommendation 1: Add a requirement to perform a damage tolerance assessment for repairs and modifications accomplished after the effective date of the ADs using a standardized compliance time of 18 months.

Recommendation 2:

- a) Standardize to a 3-step damage tolerance assessment process for new repairs, STC's and other design changes.
- b) Provide a standardized description of an acceptable damage tolerance assessment methodology, similar to Note 6 of the 727 AD, by referencing Advisory Circular 91-56A.

Recommendation 3:

- a) Eliminate the term "SSI created" in the 727/737 AD's.
- b) Criteria for determining which repaired, altered or modified structure requires damage tolerance based special inspections should be jointly developed by the cognizant ACO's, and added to the AD's.

Recommendation 4: Standardize the compliance time to perform a damage tolerance assessment for repairs and non-STC design changes accomplished before the effective date of the AD's as follows:

- a) For airplanes that have already exceeded their SSID threshold the compliance time should be 18 months after the effective date of the AD.
- b) For airplanes that have not reached their SSID threshold, the compliance time should be 18 months after the SSID threshold, or within 5 years after the effective date of the AD, whichever occurs first.

Recommendation 5: Provide a description in the AD's detailing the information to be included in the operators FAA-approved maintenance or inspection program.

Recommendation 6: Standardize the acceptance of the Repair Assessment Guidelines (RAG), where applicable, as a method of compliance to recommendation 1 and 4 requirement for a damage tolerance assessment of repairs. The RAG should only be applicable for those repairs found on the fuselage pressure vessel.

Recommendation 7:

- a) Standardize the compliance time to perform a damage tolerance assessment for STC's accomplished before the effective date of the AD's similar to paragraph (d)(2) of the 727/737 AD's, and remove paragraph (d)(1) from the 727/737 AD's.
- b) Include a note similar to Note 7 in the 727/737 AD's, which provide FAA expectations for the contents of the compliance plan specified in paragraph (d)(2).

Recommendation 8: Accomplish a separate evaluation of the Damage Tolerance National Resource Specialist concerns about the basic SSID/SID program.

Phase I Recommendation Discussion:

Recommendation 1: Add a requirement to perform a damage tolerance assessment for repairs and modifications accomplished after the effective date of the ADs using a standardized compliance time of 18 months.

The compliance time specified in paragraph (g) of the 727/737 AD for revision of the FAA-approved maintenance or inspection program is 12 months for all repairs and modifications installed after the effective date of the AD. In contrast, the compliance time specified in paragraph (d) of the MD-80 draft NPRM for revision of the FAA-approved maintenance or inspection program is 18 months. The 18 month compliance time in the MD-80 draft NPRM was based upon the compliance time that the LA ACO has been using for approval of the damage tolerance assessment of repairs on PSE's. This compliance time is linked to the 3-stage approval process, which is discussed in detail under recommendation 2 (a). Until about 5 years ago, the LA ACO had been using a 12 month compliance time for the approval of the damage tolerance assessment. However, as the result of a large increase in the number of repairs that needed to be assessed for damage tolerance, McDonnell Douglas (MDC) requested that the LA ACO extend this compliance time to 18 months. They cited difficulties in meeting the 12 month compliance time. MDC justified their request with the argument that a repair, which has been shown to meet static strength requirements, will inherently be able to resist fatigue cracking for a period greater than 18 months. The LAACO concurred with MDC and has since routinely required approval of the damage tolerance assessment 18 months after accomplishment of the repair.

The Seattle ACO does not concur with the use of an 18 month compliance time for the completion of damage tolerance assessment (DTA) of repairs and modifications for the following reasons:

1. The 18 month compliance time is not consistent with the guidelines established in AC 25.1529-1, where it states that a time period not to exceed 12 months is generally adequate for most structural repairs.
2. The airline operators are not required to retain records for minor repairs longer than 12 months, which will result in the operator's losing track of the repair date and of when the DTA is to be completed. In addition, the operator's FAA maintenance inspectors would not be able to enforce an 18 month compliance time since the operators were not required to maintain the records longer than 12 month.

The Team could find no valid argument against the MDC statement that a repair, which has been shown to meet static strength requirements, will inherently be able to resist fatigue cracking for a period greater than 18 months. The Team further reviewed AC 25.1529-1 and could find no technical justification for the 12 month compliance time providing any significantly higher level of safety than the 18 month compliance time used by the LAACO.

The Team interviewed Mr. Jim Dodge from ANM-230 to find out what operating rules would require the airline operators to maintain records longer than 12 months. The Team explained the concerns of the Seattle ACO and asked if the 18 month compliance time would be difficult for the FAA maintenance inspectors to enforce. Jim explained that 14 CFR Part 39.3 states that no person may operate a product except in accordance with the requirements of the AD. Therefore, since the SSID will be mandated by AD's, the operators would be required to comply with the terms and limitations of the AD. However, FAR 121.380 only requires that records of major repairs be kept for a maximum period of 12 months. Due to the allowance in the regulations that only require carriers to retain major repair records for 12 months, Jim indicated difficulty may result in enforcing compliance with the AD since the operator could indicate that an assessment was accomplished for a repair, and that there was no affect to the structure thus requiring no further FAA approval. The Team had similar discussions with engineering managers at separate airlines, with each responding that they believed they would have to maintain the records longer than 12 months if the AD specified a longer compliance time for an assessment to be accomplished.

After evaluating AC 25.1529-1 and considering the interviews with the airline engineers and Jim Dodge, the Team is in agreement that an 18 month compliance time for the approval of the DTA is justified and does not reduce the level of safety. Therefore, the Team recommends that the SSID AD's specify a standardized compliance time of 18 months for the accomplishment of a DTA for repairs and modifications.

Recommendation 2:

- a) **Standardize to a 3-step DTA process for new repairs, STC's and other design changes.**
- b) **Provide a standardized description of an acceptable damage tolerance assessment methodology, similar to Note 6 of the 727 AD, by referencing Advisory Circular 91-56A.**

Recommendation 2(a)

For new repairs, STC's and other design changes installed after the effective date of the AD, paragraph (g) of the 727/737 AD's states: "Within 12 months after that modification, alteration, or repair, revise the FAA-approved maintenance or inspection program to include an inspection method and compliance times for each new or affected SSI, and to include the compliance times for initial and repetitive accomplishment for each inspection."

During interviews with SACO engineers, the Team learned that SACO issued an AMOC to the 727/737 AD's that allows the use of a two-step procedure for damage tolerance assessment of repairs. The two-step approval process consists of the following:

1. Evaluate the repair to determine the inspection threshold within 12 months of installation.
2. Prior to the inspection threshold or within 12 months after accomplishing the inspection at the SSID threshold, whichever occurs first, complete the damage tolerance assessment to determine the repetitive inspection intervals based on the inspection method.

During interviews with LAACO engineers, the Team learned that LAACO has accepted a three-stage process for approval of damage tolerance assessment of repairs. This three-stage approval process consists of the following:

1. Static strength approval prior to further flight.
2. Damage tolerance assessment approval within 18 months of the static strength approval.
3. Inspection method and repeat interval approval 2 years prior to the inspection threshold determined by the damage tolerance assessment.

The concepts of the two methods are similar with some minor differences. SACO does not include the first step of the LAACO three-phase process since damaged SSID items per SACO have to be repaired using methods approved by FAA, while the LAACO AD's require that PSE's found cracked during a SID inspection be repaired in a manner approved by the manager of the LAACO. The other minor difference between the two approval processes is that LAACO allows 18 months after repair to establish the inspection threshold, while SACO allows 12 months after repair to establish the inspection threshold. Additionally, LAACO requires that the inspection method and intervals be approved 2 years prior to reaching the inspection threshold, while the SACO method requires the inspection method and intervals be established prior to the inspection threshold or within 12 months after accomplishing the inspection at the SSID threshold, whichever occurs first.

Both the SACO two-step approval process and the LAACO three stage approval process are based on the two-stage structural evaluation concept that is discussed in Advisory Circular (AC) 25.1529-1. The AC states that a time period not to exceed 12 mo. is generally adequate for most structural repairs. Until about 5 years ago, LAACO had been using a 12 month compliance time for the approval of the damage tolerance assessment. However, as the result of a large increase in the number of repairs that needed to be assessed for damage tolerance, McDonnell Douglas (MDC) requested that the LAACO extend this compliance time to 18 months. They cited difficulties in meeting the 12 month compliance time. MDC justified their request with the argument that a repair, which has been shown to meet static strength requirements, will inherently be able to resist fatigue cracking for a period greater than 18 months. The LAACO concurred with MDC and has since routinely required approval of the damage tolerance assessment 18 months after accomplishment of the repair.

As similarly discussed in recommendation 1, the team could find no technical justification for the 12 month compliance time described in AC 25.1529-1 providing any

significantly higher level of safety than the 18 month compliance time approved by the LAACO. Therefore, the team is in agreement that the use of an 18 month compliance time rather than a 12 month compliance time for the approval of the damage tolerance assessment is justified and does not reduce the level of safety.

The 727/737 AD's require that new inspection methods and compliance times for SSI's created or affected by a repair, STC, or other design change be approved by the Manager, Seattle Aircraft Certification Office. The MD-80 draft NPRM requires that new inspection methods and compliance times for PSE's affected by a repair, STC, or other design change be approved by the Manager, LAACO. The approval of a new inspection method and compliance time by the airplane's type certificate managing ACO may not make sense for STC alterations. The STC may be issued by an ACO other than the airplane's type certificate managing ACO. In this case, all of the data supporting the STC and the ACO engineering awareness of the STC modification resides in the ACO that is managing the STC.

Therefore, the team recommends that the approval of the inspection method and compliance time for STC alterations be done by the STC managing ACO and that approval of the inspection method and compliance time for repairs and non-STC design changes be done by the airplane's Type Certificate Managing ACO.

The Team also recommends that a standardized approval process for new repairs, STC's and other design changes be used by adopting the three-stage approval process as outlined above. The Team recommends that SACO and LAACO continue approval of the first phase of the process as they feel appropriate for individual SID/SSID programs. The Team recommends the use of an 18-month compliance time for the damage tolerance assessment because it provides an adequate amount of time for the operators to conduct the assessment as discussed in Recommendation 1. Even though the 18 month compliance time is not consistent with the guidance contained in AC 25.1529-1, the differences can be described in the preamble of the SSID/SID AD's, which is appropriate since the AD establishes new rulemaking. The Team concurs with the approach of requiring determination of the inspection method and repeat intervals to be established 2 years prior to reaching the inspection threshold. The Team concluded that relating the compliance time for establishment of the repair inspection method and repeat intervals to the established inspection threshold is reasonable. The 2-year compliance time will ensure that the repair inspection method and repeat intervals are in place when the repair inspection threshold is reached.

The AD's should clarify that the DTA for repairs must be approved by the ACO responsible for the type design of the aircraft, and that the DTA for STC's must be approved by the ACO, which issued the STC. This information should be communicated to all ACO's if the Manager of the Transport Airplane Directorate approves the recommendations in this report.

Recommendation 2(b)

Note 6 of the 727/737 AD's specifies that the inspection methods and compliance times should be determined based on a damage tolerance assessment methodology, such as that described in FAA Advisory Circular No. 91-56, Change 2 dated April 15, 1983. In contrast, the MD-80 draft NPRM does not specify what is considered an acceptable damage tolerance assessment methodology for determining the inspection methods and compliance times.

The Team recommends that the AD's contain a standardized note, similar to Note 6 of the 727/737 AD, that specifies an acceptable damage tolerance assessment methodology for determining the inspection methods and compliance times. The Team further recommends the standardized note reference the methodology contained in FAA Advisory Circular No 91-56A, dated April 29, 1998.

Recommendation 3.

- a) Eliminate the term "SSI created" in the 727/737 AD's.**
- b) Criteria for determining which repaired, altered or modified structure requires damage tolerance based special inspections should be jointly developed by the cognizant ACO's, and added to the AD's.**

Recommendation 3(a)

The Team noted that the 727/737 AD's used the terms "new SSI" and "created SSI" in Paragraphs (d)(1), (e), (g), and in note 7. This term was used where a repair, alteration or modification affected the aircraft structure such that damage tolerance based special inspections are required. The Team further noted that the MD-80 draft NPRM did not address any repaired, altered or modified structure that would require damage tolerance assessment other than the PSE's that had been affected by repairs, alterations and modifications. The Team recognized that the Boeing and MDC basic SSID/SID were developed differently and use two different terms for structure that requires supplemental inspections. Because of these differences, it is important that the terms SSI created and PSE created not be used in the AD's to prevent association with the OEM's basic programs.

The Team recommends that the term "new SSI" and "created SSI" not be used in the 727/737 AD's. The SSID/SID AD's should simply address the affected structure as "structure that requires damage tolerance based special inspections".

Recommendation 3(b)

Paragraph (d)(1) and (e) of the 727/737 AD's require assessment of the damage tolerance characteristics of each SSI created by a repair or design change. The

operators must revise their FAA-approved maintenance or inspection program to include inspection methods and compliance times for each SSI created.

The MD-80 draft NPRM does not contain instructions for a PSE created by a repair or an alteration or modification. However, the preamble of the MD-80 draft NPRM states that once the Aging Aircraft Safety Act becomes a final rule the MD-80 AD will be superseded to address all structural repairs, alterations and modifications and not just those that “affect” a PSE.

During interviews, LAACO engineers indicated that the MD-80 draft NPRM takes into account the proposed Aging Airplane Safety Rule, which has been issued as an NPRM (Notice 99-02). This rule will require that within 4 years after the effective date that the operators maintenance program include damage tolerance based inspections and procedures, for all repairs and modifications, including STC’s. This rule will be applicable for all Parts 121, 129, and 135 operating rules. The Aging Airplane Safety Rule is expected to become a final rule in February of 2001.

The Team believes that it is important that all repairs, alterations and modifications to airplanes with mandated SSID/SID programs have a damage tolerance assessment accomplished in order to determine if damage tolerance based special inspections are necessary.

The Team evaluated the proposed Aging Airplane Safety Rule and determined that it is not as specific as the SSID/SID AD’s in its requirement to accomplish a damage tolerance assessment and determination of supplemental inspections. The rule does not involve the ACO engineers in the review and approval of damage tolerance based inspection programs. The proposed operating rule states that the operators must have a maintenance program that includes damage tolerance based inspections and procedures. The airplane operators have the freedom to submit a damage tolerance based maintenance program to their Principal Maintenance Inspector, with no requirement for the cognizant ACO’s review and approval of the damage tolerance assessment, inspection method, and interval. In addition, the Safety Rule is not applicable to Part 125 operators, which are cargo operators. The cargo operations fleet typically consists of older airplanes with a large number of these airplanes having undergone passenger to freighter modifications. These freighters often incorporate several significant modifications, which may include auxiliary fuel tanks, zero fuel weight increases, engine hush kits, and winglets. The Team also evaluated whether the SSID/SID AD’s will conflict with the proposed Aging Airplane Safety Rule. The Team determined that the requirements of the AD’s will not be in conflict with the Safety Rule, but will actually provide the operators with a method to comply with the rule.

The Team recommends the development of criteria for the determination of what repaired, altered or modified structure requires damage tolerance based special inspections. The criteria, similar to the example provide below, should be jointly developed and adopted by all the cognizant ACO’s:

A damage tolerance assessment must be accomplished for all repaired, altered or modified structure if all of the following criteria have been met:

1. The structure contributes significantly to the carrying of flight, ground or pressurization loads.
2. The integrity of the structure is essential in maintaining the overall integrity of the airplane.

Recommendation 4: Standardize the compliance time to perform a damage tolerance assessment for repairs and non-STC design changes accomplished before the effective date of the AD's as follows:

- a) **For airplanes that have already exceeded their SSID threshold the compliance time should be 18 months after the effective date of the AD.**
- b) **For airplanes that have not reached their SSID threshold, the compliance time should be 18 months after the SSID threshold, or within 5 years after the effective date of the AD, whichever occurs first.**

The compliance time specified in paragraph (e) of the 727/737 AD for revision of the FAA approved maintenance or inspection program for repairs and non-STC design changes accomplished prior to the effective date of the AD, is 12 months after the first SSID inspection. The 727/737 AD's address both SSI's created and affected by the repair or design change. In contrast, the compliance time specified in paragraph (c) of the MD-80 draft NPRM for revision of the FAA approved maintenance or inspection program for repairs and modifications (including STC's) accomplished prior to the effective date of the AD, is 5 years after the effective date of the AD. The MD-80 draft NPRM addresses PSE's affected but not PSE's created by the repair or design change.

From the Team's interviews with an airline operator, it was apparent that paragraph (e) was the only section of the 727/737 AD's they found acceptable. They indicated that other 727/737 operators shared this position. Paragraph (e) allows the operators to assess the "old repairs" and "old design changes" at the next SSID inspection and then allows 12 months after the inspection to determine if a new inspection method or inspection interval is required.

During interviews, LAACO engineers voiced concern about inconsistencies in the compliance time of paragraph (e) of the 727/737 AD's. Their concern is that design changes and repairs installed before the effective date of the AD are not addressed until 12 months after the first SSID inspection, which could be many years in the future. This is in contrast to the requirement that design changes and repairs installed after the effective date of the AD be addressed within 12 months after installation. They state that because of this inconsistency, the 727/737 AD's imply that new repairs and design changes are less fatigue resistant than old repairs and design changes which could be up to 20 years old.

The Team believes there is merit to both the 727/737 operator's and LAACO concerns about the compliance time for repairs and design changes accomplished prior to the effective dates of the AD's. The Team recognizes that the 727/737 operators do not know about all the repairs installed on their airplanes, and some operators may not have sufficient data on the repairs and design changes in their fleets. Because of this, the operators need sufficient time to identify and address these repairs and design changes.

LAACO engineers indicated that there should not be the same concern regarding lack of operator knowledge of repairs affecting the PSE's. This is because repairs and modifications that affect PSE's, the entire PSE must be inspected prior to the threshold or have an AMOC. Additionally, Boeing South engineers indicated that if an operator finds that they cannot accomplish a SID inspection due to the existence of a repair or modification, that discrepant PSE must still be inspected prior to the SID defined threshold, unless a new threshold is approved by the LAACO. However, FAA Legal Counsel expressed concern during the Team's interview, that operators of MDC airplanes may not be ensuring that damage tolerance assessment and any changes to the PSE inspections are being accomplished on 100% of PSE repairs. Legal Counsel referred to comments from the airline operators represented at the Joint Management Team meetings, as stating they don't treat SRM repairs as "major" and have no procedure for tracking or informing their engineering organizations when SRM repairs are installed. Based on these comments, Legal Counsel questioned the validity of assuming 100% reporting of repairs on the MDC fleet.

Based on all these comments and concerns, the Team recommends a standardized compliance time for the 727/737 and MD-80 fleets that have exceeded the SSID threshold. The MDC operators should not be affected since they should already be in compliance, and the 18 month compliance time will then allow time for the 727/737 operators to comply. If there happens to be some MDC operators that are not currently in compliance with reporting all their repairs and modification to PSE's, the standardized compliance time will provide sufficient time for them to comply as well. The Team also recognizes that repairs and modifications on relatively young airplanes should not be ignored until the first SSID inspection, and that a compliance time similar to the MD-80 draft NPRM would be appropriate.

Therefore, the Team recommends a combination compliance time broken into two categories. For airplanes that have already exceeded their SSID threshold, the compliance time should be 18 months after the effective date of the AD. For airplanes that have not reached the SSID threshold, the compliance time should be 18 months after the SSID/SID threshold, or within 5 years after the effective date of the AD, whichever should occur first. This proposed two-category compliance time would provide the operators adequate time to assess the repairs and design changes on the airplanes if they have either exceeded or are approaching the SSID threshold. It also provides up to 5 years to make the assessment if their airplanes are still young.

The Team chose to use the SSID/SID threshold as the benchmark for the compliance time rather than the first SSID inspections, as was previously used in the 727/737

AD's. By using the inspection threshold, operators who may have accomplished the first SSID/SID inspection significantly before the SSID threshold will not be penalized. Additionally, since the two-categories are divided based on whether the inspection threshold has passed, a benchmark of inspection threshold is necessary to avoid confusion regarding compliance times.

Recommendation 5: Provide a description in the AD's detailing the information to be included in the operators FAA-approved maintenance or inspection program.

The MD-80 draft NPRM does not provide a description of the information that should be included in the operators FAA-approved maintenance or inspection program. In contrast, Paragraph (d)(2)(iii) of the 727/737 AD's provides instruction to "revise the FAA-approved maintenance or inspection program to include an inspection method for each new or affected SSI, and to include the compliance times for initial and repetitive accomplishment of each inspection. The inspection methods and the compliance times shall be approved by the Manager, Seattle ACO." The Team recognizes from interviews with the Seattle AEG and operators that information clarifying the FAA's expectations for AD compliance will reduce miscommunication. The Team recommends the SSID/SID AD's provide compliance information similar to what is shown in Paragraph (d)(2)(iii) of the 727/737 SSID AD to clarify the AD requirements.

Recommendation 6: Standardize the acceptance of the Repair Assessment Guidelines (RAG), where applicable, as a method of compliance to recommendation 1 and 4 requirement for a damage tolerance assessment of repairs. The RAG should only be applicable for those repairs found on the fuselage pressure vessel.

Note 6 of the MD-80 draft NPRM accepts the Aging Aircraft Repair Assessment Guidelines (RAG) as an acceptable method of compliance for the draft NRPM. Currently, the 727/737 AD's do not recognize the RAG's as an acceptable method of compliance to the AD's. The Repair Assessment Program is mandated by Part 91.410, 121.370, 125.248 and 129.32 operating rules, with the RAG's being approved as an acceptable method of complying with the damage tolerance assessment and inspection requirements of the rules. Because the RAG's are approved by the cognizant ACO's and contain damage tolerance based inspections for certain repairs, they should be accepted as a method of compliance for those repairs found on the fuselage pressure vessel.

Recommendation 7:

- a) Standardize the compliance time to perform a damage tolerance assessment for STC's accomplished before the effective date of the AD's similar to paragraph (d)(2) of the 727/737 AD's, and remove paragraph (d)(1) from the 727/737 AD's.**
- b) Include a note similar to Note 7 in the 727/737 AD's, which provide FAA expectations for the contents of the compliance plan specified in paragraph (d)(2).**

The compliance time specified in paragraph (d) of the 727/737 AD's provides the option of two compliance times. This paragraph addresses SSI's affected by STC's accomplished prior to the effective date of the AD. Paragraph (d)(1) requires that a damage tolerance assessment and new inspections be determined within 18 months of the AD effective date. Paragraph (d)(2) provides for a three phase compliance time that includes a requirement for an accomplishment plan to be submitted within 18 months, interim detail visual inspections at 18 month intervals, and a completed assessment and inspection criteria developed within 48 months of the effective date of the AD. In contrast, the compliance time specified in paragraph (c) of the MD-80 draft NPRM requires that a damage tolerance based inspection be approved within 5 years after the effective date of the AD. This is applicable to all repairs and modifications (including STC's) accomplished prior to the effective date of the AD, which affects the PSE.

From the Team's interviews, it became evident that the 727/737 AD's, paragraph (d)(1) compliance time option has not been used. Most, if not all, operators have chosen to comply with paragraph (d)(2), since it provides the operators with more time to accomplish the damage tolerance assessment and develop an inspection program. The interim detail visual inspections have not been objectionable to the operators because of the non-intrusive nature of a visual inspection and because the inspection intervals coincide with the operator's standard "C" check maintenance interval. Since this option in paragraph (d)(1) is not used but is essentially encompassed by paragraph (d)(2), the Team recommends that paragraph (d)(1) in the 727/737 AD's be removed.

From interviews at the LAACO, there was a concern that the 727/737 paragraph (d)(2) requirement for an accomplishment plan to be submitted to the ACO for approval would create a large amount of unnecessary work. However, interviews with SACO engineers and AEG revealed that the review of the plans required by paragraph (d)(2) has caused only a small increase of work. In contrast, the SACO engineers discussed how the operators are submitting large amounts of data for approval at the end of the compliance time for paragraph (e) of the 727/737 AD's. Paragraph (e), for repairs and non-STC design changes accomplished prior to the effective date of the AD, does not require submittal of a plan, but instead requires revision of the FAA approved maintenance or inspection program. They stated that in many cases, the submitted data is incomplete or incorrect because the operators are unaware of what is required to accomplish an acceptable damage tolerance assessment and inspection method determination. These last minute data submittals have resulted in a more extensive workload in the SACO with a large number of AMOC's being generated to prevent grounding airplanes. The increased workload to review the plans as suggested in paragraph (b) of the Team's

generic AD will decrease last minute data submittals, and will result in better quality data submittals. It is not anticipated that paragraphs (a) and (c) of the Team's generic AD suggestions for a maintenance or inspection plan revision will create a large workload for the LAACO. This is because of the nature of the MDC SID program, which has always implicitly required operators to accomplish damage tolerance assessment on repairs or alterations that affect a PSE.

Recommendation 7(a)

The Team recommends the SSID/SID AD's include a slightly modified 727/737 AD's, paragraph (d)(2) type of compliance method with a requirement for a plan submittal within 18 months, interim detailed visual inspections accomplished at 18 month intervals, and a complete damage tolerance assessment with inspection methods approved and included in the operators maintenance or inspection program, within 5 years of the effective date of the AD.

Recommendation 7(b)

The Team also recommends that a clarification note be included, similar to Note 7 in the 727/737 AD's, which provides concise FAA expectations of what should be included in the compliance plan.

Recommendation 8: A separate evaluation of the Damage Tolerance NRS concerns about the basic SSID/SID programs should be made.

The Team recognizes that Bob Eastin, the Damage Tolerance NRS, has made significant comments about the basic SSID/SID programs and other aging aircraft initiatives during interviews with the Team. Many of these comments and concerns are beyond the scope of this Team's charter but warrant further consideration.

Phase II Discussion:

The process used to develop the recommendations for the Phase II SSID review is very similar to that used during the Phase I review. Prior to making any recommendations, the Team conducted interviews with each of the FAA program managers for the aircraft included in the phase II review. In addition, engineers from the aircraft manufacture were interviewed for additional clarifying information regarding the respective manufacture SSID. The information gathered from these interviews, as well as the Team's own review of the documents was assembled into a summary for each of aircraft, and is included in the following pages of this discussion. From the information gathered, the Team identified significant items from each manufacture's SSID and from each FAA AD and included those detailed items in a table to provide a comparison of the 6 separate Programs and AD's. This comparison table is included in Appendix I of this report.

Even though the CASA C-212 was not identified as being one of the aging fleet aircraft on the SSID Team Charter, the Team became aware that this airplane had a SSID that was mandated by an FAA AD. The Team gathered information for the CASA C-212 and evaluated both the CASA SSID and the FAA AD along with those airplanes identified in the Team Charter. The Team's recommendations, the summary discussion and the comparison table in Appendix I all reflect the Teams evaluation of this airplane.

The Team reviewed the Phase I recommendations for applicability towards the Phase II SSID AD's. In addition, the Team has provided recommendations for specific items discovered during the Phase II review. The complete list of recommendations for the Phase II review are contained in the Phase II recommendations section of this report. A detailed justification is provided for each of the new recommendations with a reference to the Phase I recommendation discussion section for those Phase I recommendations that the Team determined to be applicable to the SSID AD's evaluated during Phase II.

The Team has reviewed and determined that the Generic SSID AD that was provided for the Phase I review is also applicable for the Phase II SSID AD's. The Generic AD is located in Appendix G of this report.

Summary information for each of the 6 SSID programs and their respective AD's are located in Appendix L of this report.

Phase II Recommendations and Discussion:

The following list contains recommendations that the Team agrees should be considered for the revision of the six airplane models evaluated in phase II of the SSID review. Recommendations II-1 through II-7 are essentially the same as recommendations 1 through 7 from the Phase I SSID review. The full justification and discussion of recommendations II-1 through II-7 are provided in the Phase I Recommendations Discussion section of this report and are not repeated here. Because recommendations II-8, II-9, and II-10 are unique to Phase II of the SSID review, a discussion of these recommendations is provided.

Recommendation II-1: Add a requirement to perform a damage tolerance assessment for repairs and modifications accomplished after the effective date of the AD's using a standardized compliance time of 18 months.

Recommendation II-2:

- a) Standardize to a 3-step damage tolerance assessment process for new repairs, STC's and other design changes.
- b) Provide a standardized description of an acceptable damage tolerance assessment methodology, similar to Note 6 of the 727 AD, by referencing Advisory Circular 91-56A.

Note for recommendation II-2: The AD's should clarify that the DTA for repairs must be approved by the ACO responsible for the type design of the aircraft, and that the DTA for STC's must be approved by the ACO, which issued the STC. This information should be communicated to all ACO's if the Manager of the Transport Airplane Directorate approves the recommendations in this report.

Recommendation II-3: Criteria for determining which repaired, altered or modified structure requires damage tolerance based special inspections should be jointly developed by the cognizant ACO's, and added to the AD's. (Note: The Seattle and Long Beach ACO's have agreed on a criteria which is included in Appendix I of this report)

Recommendation II-4: Standardize the compliance time to perform a damage tolerance assessment for repairs and non-STC design changes accomplished before the effective date of the AD's as follows:

- a) For airplanes that have already exceeded their SSID threshold the compliance time should be 18 months after the effective date of the AD.
- c) For airplanes that have not reached their SSID threshold, the compliance time should be 18 months after the SSID threshold, or within 5 years after the effective date of the AD, whichever occurs first.

Recommendation II-5: Provide a description in the AD's detailing the information to be included in the operator's FAA-approved maintenance or inspection program.

Recommendation II-6: Standardize the acceptance of the Repair Assessment Guidelines (RAG), where applicable, as a method of compliance to recommendation II-1 and II-4 requirement for a damage tolerance assessment of repairs. The RAG should only be applicable for those repairs found on the fuselage pressure vessel.

Recommendation II-7:

- a) Standardize the compliance time to perform a damage tolerance assessment for STC's accomplished before the effective date of the AD's similar to paragraph (d)(2) of the 727/737 AD's.
- b) Include a note similar to Note 7 in the 727/737 AD's, which provide FAA expectations for the contents of the compliance plan specified in paragraph (d)(2).

Recommendation II-8:

- a) Mandate the latest revision of the SSID for Airbus A-300, Boeing 707/720, CASA C-212, and Fokker F-28.
- b) Implement a process to evaluate SSID program revisions to determine whether the latest revision needs to be mandated by AD.

Note: Lockheed is in the process of developing a SSID for the L1011-3. Lockheed's schedule for publication of the L10-11-3 SSID is December 2001. The L1011 program manager needs to track progress of the L1011-3 SSID to ensure that it is in place in sufficient time for the inspections to be mandatory before the L1011-3 fleet reaches the earliest threshold. As of 6/30/01, the highest flight and cycle time L1011-3s have accumulated 78,400 hours and 17,900 cycles respectively. If the L1011-3 SSID will not be in place prior to the first airplane reaching the earliest threshold, we may want to evaluate the option of mandating the current SSID for use on the L1011-3 airplane.

The team found that for four of the six models (Airbus A300, Boeing 707/720, Fokker F-28, and CASA C-212), the latest revision of the SSID program had not been mandated by an FAA AD. In all of these cases, the latest revision of the SSID was found to add requirements such as additional airplanes, additional inspections or modified inspection intervals. A process should be implemented to aid the program managers to use

Recommendation II-9: The requirement for repair prior to further flight of any cracks found during a SSID inspection should be continued, in accordance with Transport Airplane Directorate memorandum ANM-112:IC, dated March 8, 1983.

Currently, the SSID ADs for all of the 12 aging airplanes require that cracks found during SSID inspections be repaired prior to further flight. The team is aware that pressure has been applied by some of the airplane manufacturers for the FAA to allow the option to defer repair of some cracks found during SSID inspections. The Team is opposed to this proposed general allowance of continued flight with a know crack, since the structure identified as a SSID inspection item has been determined to be critical for the continued safe flight of the airplane. The requirement to repair prior to further flight any crack found during a SSID inspection recognizes this criticality and should remain in the SSID

AD's for all SSID programs. This was also addressed in Transport Airplane Directorate memorandum ANM-112:IC, dated March 8, 1983, which can be found in Appendix J of this report.

In the event that an operator feels that justification exists to defer the repair of a crack found during a SSID inspection, the operator still has the option to request an alternative method of compliance to the AD requirement. The cognizant ACO's may continue to approve limited flights with a know cracks on a case-by-case basis as currently documented in ACO standard procedures.

Recommendation II-10: Disallow the fleet sampling allowance currently in the Airbus A300 SSID, and the rotational sampling program in the CASA C-212 SSID.

As documented in the preamble of the 727 final rule AD 98-11-03, the FAA identified that the policy established in AC 91-56 anticipated that all SSID programs would establish inspection thresholds for the entire fleet. The candidate fleet approach for the 727 was originally based on an understanding that the airplanes in the candidate fleet would continue to represent the entire fleet and would have the highest number of flight cycles in the fleet. In practice, this approach did not fulfill the intent of AC 91-56, because the extensive modification and repairs of both candidate and non-candidate fleet airplanes resulted in a candidate fleet that was no longer representative. Even if the modifications and repairs installed on the fleets were not at issue, the constant monitoring and evaluating of the changes to the fleet is extremely burdensome for the FAA to maintain with the requirement that the SSID AD's be superseded on an annual basis. Based on the discussions already documented in both the 727 and 737 SSID final rules, and the ineffectiveness of revising the SSID AD's on an annual basis, the team recommends that all fleet sampling and rotational sampling not be allowed on new SSID AD's.

This recommendation is not meant to include fleet sampling programs that are accomplished prior to the inspection thresholds for the purpose of gathering data to substantiate possible threshold extensions. These types of fleet sampling programs do not affect the intent of AC 91-56 because the entire fleet is still required to inspect at the inspection threshold. However, this type of fleet sampling program may result in the SSID inspection threshold possibly being extended provided sufficient fleet data from the fleet sampled inspections can substantiate a change in the inspection threshold.