

The highest priority of the Grumman Owners & Pilots Association (GOPA), as expressed in the organization's Mission Statement¹ is the operational safety of the fleet. The personal safety of all individuals flying in Grumman Aircraft² cannot be compromised.

This commentary represents the organizations' response to a request for comments. The proposed rule, Docket No. FAA-2021-1017, Project Identifier AD-2021-00495-A³, affects True Flight Holdings LLC Airplanes, better known as Grumman Aircraft.

It is critical that the aircraft be inspected annually in a manner that will disclose any delamination of bonded joints. To insure the integrity of bonded joints the fuselage, wings, stabilizers and control surfaces must be inspected, either visually or using the tap test method, as appropriate, at each annual or 100 hour inspection. Methodologies for performing bondline inspection have been well documented. Issued between 1974 and 2020, these include: the Gulfstream Maintenance Manual⁴, a Service Letter No. 74-2⁵, a Service Bulletin SB155⁶, and an Airworthiness Directive AD 76-17-03⁷. All have required and/or provided methodologies for bondline delamination inspection.

Even with extensive documentation requiring bondline inspection, N5880L, an AA5 aircraft manufactured in 1972, s/n 0080, had an accident⁸ on January 19, 2021, due to a bondline failure. The

¹ Grumman Owners & Pilots Association Mission Statement: <https://grummanpilots.org/mission>

² Grumman Aircraft include those manufactured by American Aviation Corporation (AA1, AA1A, AA1B and AA5); Grumman American Aviation Corporation (AA1B, AA1C, AA5, AA5A and AA5B); Gulfstream American Corporation (AA1C, AA5A and AA5B). While not included in the proposed AD, American General and Tiger Aircraft both produced the AG5B, which is typically included in "Grumman Aircraft." True Flight Aerospace is the current A16EA Type Certificate holder.

³ Federal Aviation Administration (FAA), DOT. December 1, 2021. Docket No. FAA-2021-1017. Project Identifier AD-2021-00495-A. <https://www.federalregister.gov/documents/2021/12/01/2021-26041/airworthiness-directives-true-flight-holdings-llc-airplanes>

⁴ Maintenance Manual: Gulfstream Aerospace Corporation, Issued Nov 15, 1976 and Revision 4: June 1, 1983, Chapter 5-2-1, p 208 (C. 10), p 209 (D. 4), p 210 (E. 2), Chapter 5-5-1, p 204 (1. D. 1 and 1. D. 3) and (2. A, B, C); and Tiger Aircraft LLC Revision 5, March 1, 2004, Chapter 5-2-1, p 209 (D. 4).

⁵ Service Letter No. 74-2, Grumman American Aviation Corporation, February 6, 1974: *Bondline Inspection Procedures*. Time of compliance: at each scheduled inspection.

⁶ Service Bulletin SB155, Grumman American Aviation Corporation, July 30, 1976: *Bondline Protection*. Time of compliance: within the next 25 flight hours.

⁷ Airworthiness Directive 76-17-03, Department of Transportation, August 30, 1976: *To detect Delamination in Bonded Skins*. This AD required the one time inspection prescribed by SB155 within 25 flight hours' time in service. https://rgl.faa.gov/Regulatory_and_Guidance_Library/rgad.nsf/0/15ABBB4154F287DA86256A38005E36C8?OpenDocument&Highlight=76-17-03

⁸ National Transportation Safety Board, Aviation Accident Preliminary Report, January 19, 2021, Accident Number ERA21LA106.

<https://data.nts.gov/carol-reppen/api/Aviation/ReportMain/GenerateNewestReport/102531/pdf>

bondline between the upper surface of the horizontal stabilizer and the outboard rib appears to have failed. Following this, fatigue failure of the rib along the forward edge of the elevator hinge attach bracket allowed the hinge bracket to separate from the horizontal stabilizer.

What is important to observe is that if the bondline inspections required by the aforementioned documents had been performed, this accident would likely not have occurred. This accident was not a failure of technical guidance. It was a *Human Factors* issue. It appears the scope of the annual/100 hour inspection, as performed, was not adequate to disclose a bondline failure. Neither was the PIC's preflight inspection, as neither disclosed the failed bondline.

An article addressing the accident appeared in the March/April 2021 issue of the International Grumman Star⁹ (Cotter 9-11). This article served a similar effect as a Special Airworthiness Information Bulletin (SAIB) for the Grumman Aircraft community.

The Star article suggested critical areas that should be inspected for delamination, as relevant to the accident aircraft. It also documented the substantial differences in the design of the horizontal stabilizer and elevator used on the AA5A, AA5B and AG5B airframes from the AA1* and AA5 airframes. These are critical differences in the design of the two airframes' horizontal stabilizer and elevator attachment methodology: the AA5A and AA5B airframes use a different and much more robust elevator to horizontal stabilizer attachment methodology than the AA1* and AA5 airframes (Cotter pp 9-11).

After reading the Star article the owner of a 1975 Traveler: AA5-0755, N1355R, contacted the Star articles' author for assistance in analyzing suspected delamination of his aircraft. It is likely this aircraft was later examined by an FAA Airworthiness Inspector and a representative of True Flight Aerospace. A contributing cause of bondline delamination may be the way this AA5 was stored: tied down outside. Environmental factors appear to contribute to bondline delamination.

Following examination of N5880L and N1355R, on June 1, 2021 True Flight Aerospace issued Service Bulletin SB-195 A¹⁰. This service bulletin appears to have been authored by two individuals, Kevin Lancaster, the businessman/owner of True Flight Aerospace, and Loyd Montague, a senior aircraft mechanic/IA at True Flight Aerospace. In June 2021, AD 2021-14-12¹¹ was issued, mandating the

⁹ International Grumman Star, J.D. Cotter, pp 9-11.

https://aya.org/resources/Star%20Magazine/2021/March_April_2021_EStar.pdf

Also available to the public at <https://grummanpilots.org/News>

¹⁰ Service Bulletin SB-195 A, True Flight Aerospace, LLC, issued June 1, 2021: *Bondline Inspection*. This SB was a revision of SB-195 published a week earlier on May 24, 2021.

<https://trueflightaerospacecom.files.wordpress.com/2021/06/sb-195a-bondline-inspection-1.pdf>

¹¹ Airworthiness Directive 2021-14-12, Department of Transportation, July 12, 2021: Requires Inspecting the Horizontal Stabilizers, Including the Bondlines, for Cracks, Buckles, Corrosion, Delamination, Rust, and Previous Repair and Repairing or Replacing Parts and Applying Corrosion Inhibitor as Necessary. Time of compliance: within the next 25 hours time-in-service or at the next scheduled 100 hour or annual inspection. This AD makes SB195-A mandatory.

[https://rgl.faa.gov/Regulatory_and_Guidance_Library/rgad.nsf/0/7a2546fcee0b31b68625871004cc080/\\$FILE/2021-14-12.pdf](https://rgl.faa.gov/Regulatory_and_Guidance_Library/rgad.nsf/0/7a2546fcee0b31b68625871004cc080/$FILE/2021-14-12.pdf)

performance of Part B of SB-195 A for AA1, AA1A, AA1B, AA1C and AA5 aircraft. Of note is that, except for the AA1C, these are the same airframes identified in AD 76-17-03, for the same debonding issue.

SB-195 A differs from all previous guidance in the maintenance manuals, service letter, service bulletin and airworthiness directive for performing bondline inspection: It requires the “Tap Test” method as the first inspection method. All previous documentation required visual inspection followed by tap test, as appropriate.

SB-195 A (p 2, A. 1.) states “with a coin or similar object,” and the illustration on page 5 appears to have been taken from the original maintenance manual. For decades a *composite tap hammer* has been the appropriate tool for tap testing bondlines for delamination. A coin, such as a quarter, has a serrated edge, like a file. There is a possibility that hitting the painted surface over an extended period of time with a coin could damage the paint finish. This is how corrosion begins. The possibility of this damage to the aircraft’s finish is acknowledged by one of the authors of SB-195 A in his comment to this proposed AD (Montague¹²).

There are locations on the airframes’ bonded structure that it is not possible to determine delamination by visual means. In these locations tap testing, using a composite tap hammer, might be appropriate. An example: it is difficult to see the bondlines in the vertical stabilizer. For the vertical stabilizer, tap testing is appropriate. But mandatory tap testing of all of the easily identified nominal condition rib bondlines in the wing is inappropriate and wasteful.

A few airframes have been repaired with thicker aluminum wing and control surface skins. These types of repairs make “tap testing” a marginal inspection method. Visual inspection of the bondline where delamination is suspected, using available technology such a borescope or camera, is a more appropriate way of examining for delamination in these circumstances.

The proposed Airworthiness Directive will take a lot of time and financial resources away from routine inspection and required maintenance of the fleet, as it is currently performed by qualified and knowledgeable mechanics and IAs. The eight hours estimated by the FAA to tap test all airframe bondlines is less than what will typically be required, even more so for individuals not skilled in tap testing. Additionally, the suggested cost per hour of \$85 is considerably less than charged in most parts of the country. The financial burden of the proposed AD is understated.

Though they ask for data, neither the FAA nor True Flight Aerospace has published or disclosed any data that would allow the aviation community to respond to this NPRM in an informed manner. A search of the FAA’s online Service Difficulty Reporting System (SDRS)¹³ discloses no reports for any Grumman aircraft. An Aviation Maintenance Alert from September 1999¹⁴ (p 9) disclosed an AA5B aileron wing skin as being delaminated. Unfortunately, the year of manufacturer of the aircraft was not provided.

¹² Loyd Montague, Dec 21, 2021: <https://www.regulations.gov/comment/FAA-2021-1017-0017>

¹³ FAA Service Difficulty Reporting System (SDRS): <https://av-info.faa.gov/sdrx/Query.aspx>

¹⁴ Aviation Maintenance Alert, September 1999¹⁴ (p 9):
https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_43-16A_Alert.pdf

The year of manufacturer would identify whether the aircraft was assembled using a bonding system, referred to as “purple glue” which has been associated with a majority of known bondline delamination. Some aircraft, or component parts of those aircraft such as a flight control surface or flap, manufactured in 1974, 1975 and early 1976 may had been assembled using purple glue. For these aircraft, attention to detail when performing bondline inspection is especially important.

It needs to be stressed that bondline inspection by *visual* and *tap test* (as appropriate) methods is REQUIRED at every annual or 100 hour inspection by existing documentation. The problem of undisclosed bondline delamination was best described in the July 30, 1976 Service Bulletin: *“It has been observed, however, that the prescribed inspections and maintenance procedures are not being uniformly applied, and in some cases, they are simply disregarded.”*

Referencing FAR 43.13 Appendix D¹⁵ may not provide the scope and detail of inspection criteria needed for adequately inspecting Grumman Aircraft. Nowhere in Appendix D do the words “bondline” or “delamination” appear. Yet the vast majority of logbook annual inspection signoffs state: “inspected in accordance with 43.13 Appendix D”. An AD requiring IAs to use the Gulfstream American Maintenance Manual and its Inspection Checklist would make a significant contribution to safety of the fleet, far more than tap testing all bondlines.

If the FAA is determined to force inspectors to inspect for bondline delamination, a far less desirable solution would be to require a one-time inspection using the “tap test” method as per SB-195 A. This could be followed by a recurring inspection at 500 hour intervals. But to reiterate, this is a misguided solution to a human factors issue.

The majority of inspectors (IAs) are doing an adequate job of maintaining the fleet using the existing guidance. Replication of an existing AD that is far more onerous and costly in scope, requiring an SB authored by two individuals, based on a low number of examples of aircraft produced between 1974 and 1976, years in which there were some failures of the glue, does not serve to increase the overall operational safety of the fleet. To force this inspection on airframes that were built in 1977, 1978 and 1979, which have a far more robust control surface attachment system, is even more draconian.

Had the author of Airworthiness Directive 76-17-03 requiring bondline inspection changed only one word in that document, it is likely the non-fatal accident that occurred to N5880L could have been completely prevented. Instead of “Recurring: No” change it to “Recurring: Yes”.

It has not been demonstrated that the proposed Airworthiness Directive, AD-2021-00495-A, will increase safety of the fleet. Requiring “tap testing” of the entire airframe at every annual is a mistake. It only serves to remove discretionary inspection authority from those who possess an IA (Inspection Authorization). Many of these individuals are keenly aware of and attend to the unique attributes of Grumman Aircraft. Performing annual and 100 hour inspections in accordance with existing maintenance documentation (prior to SB-195 A, A. 1,) and conducting thorough preflight inspections, *will* increase safety of the fleet.

¹⁵ FAR 43 – Appendix D, Scope and Detail of Items to be Included in Annual and 100 Hour Inspections.
<http://www.faa-aircraft-certification.com/43-appendix-d.html>