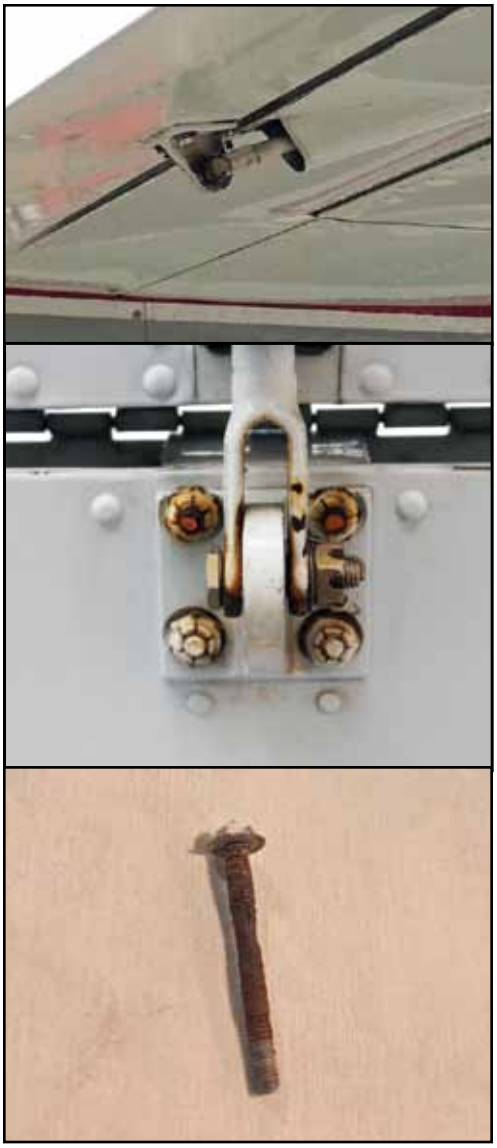
NEW AD ON ELEVATOR TRIM HARDWARE AFFECTS ALL TWIN CESSNAS

by Tony Saxton, Director of Tech Support

On February 29th of this year, Cessna issued MEB-27-02 which mandates the replacement of elevator trim push-pull tube hardware. My initial response was "Cessna, what took you so long"?

The problem surrounding this area has been going one for decades and should have been well known by Cessna, having been the direct cause of an internal company accident over four decades ago.

During the very first test flight of the Cessna 340 model in April of 1970, the airplane lost the elevator trim attach bolt, and the resultant tab flutter jammed the tab full up, with a severe nose pitch down. This high G overspeed caused parts of the tail to fail and the 340 entered an inverted flat spin to the ground that killed Don Evans, the test pilot.



Elevator trim hardware has been a Twin Cessna trouble spot since the beginning. The attach bolts are often the wrong hardware and in poor condition.

Cessna immediately changed the production specifications of the aircraft to include the hardware called out in current MEB-27-02 and also released a service bulletin, ME73-15 to replaced the hardware in previously produced 300-400 series aircraft. Again, in 1977, Cessna released service Bulletin ME77-34 for all models 310-421 Trim Control System Inspection.

Any one who has attended one of out The Twin Cessna Flyer seminars will recall me telling this story and pointing out the area. I've been doing this in each and every session since we started in the early 1990's. Yet even with all of this information available, failures in this area continued including such fatal accidents as a 310R in January 1999, a 402B in April 2001, and a 310Q in November 2002. Additional non-fatal incidents have occurred.

Owners worry about engines, radios, landing gear etc., but as I say about these lowly bolts during the seminars, "This right here will kill you!" In addition to hardware replacement, we preach at the seminars to know where and what these attach bolts look like and preflight inspect them, especially following any type of maintenance event.

On Friday April 8th, the FAA announced that it would be issuing an AD immediately to make compliance with the Service Bulletin mandatory. (I am writing this on April 9th, so any developments after this date are not covered.) Unlike most AD notes which are released as proposals and have a lengthy comment period prior to enacting, this one doesn't. Instead it was sent directly to "Final Rule" due to the FAA's determination that "immediate safety of flight condition" was affected. Additionally, with a compliance cost calculated at $103.50 per aircraft, it was determined that the AD "will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulator Flexibility Act."

Tony (center) demonstrating how to inspect elevator trim tab connection hardware at a Systems Seminar. It's not uncommon to find improper parts and severe corrosion. This AD will further address these issues.

My question is what's the rush now? This situation has been going on for a long time with several of the cited accidents happening 15 or more years ago. While I'm not opposed to the intent of this action, there are some significant errors that need to be worked out (see my letter to the FAA that on page 21). These could have been formalized prior to release if normal AD procedures would have been followed.

Mr. Adam Hein
Aerospace Engineer
Wichita, FAA Aircraft Certification Office

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1801S Airport Road Room 100
Wichita, KS 67209

In reference to our short phone conversation of Friday afternoon regarding Directorate ID 2016-CE-AD Elevator Trim:

I have been the Director of Tech Support for the twin engine Cessna owners organization, "The Twin Cessna Flyer" for 27 years and for 40 years have also owned and operated a maintenance facility that specializes specifically in twin Cessna aircraft, working on 150+ of these models annually.

I have long been aware of the accidents caused by this subject area, as far back as the Cessna test pilot fatal accident during the very first test flight April 1970 of the Cessna 340 which was found to be caused by separation of the hardware in the elevator trim. My shop has for decades internally mandated proper installation of the hardware as was directed in earlier Cessna service bulletins ME73-15 as well as ME77-34.

During ongoing maintenance as well as compliance with the previous mentioned service bulletins I have several issues with the current service Bulletin MEB-27-02 that should be considered before it is embraced verbatim by the pending AD.

1) Cessna kit and directions specifies for the installation of an NAS464P3-8 bolt only. The problem is that many of the affected early aircraft originally had installed a AN3-7A with a MS20365-1032C lock nut. When installing the new NAS464P3-8 and the designated washer and MS17826-3 nut, it is often found that the grip length is not long enough to allow for cotter pin installation. This condition also occurs in some of the later model aircraft at random depending on the quality (or lack thereof) of the machining on the trim rod attachment fork ends. This condition may require the installation of a longer NAS464P3-9 bolt to properly install the required cotter key.

This type of deviation in bolt length seems to be totally disallowed per statements in MEB-27-02 item #2. Some consideration needs to be given for deviation in grip length as necessary for proper bolt fit.

2) With installation of the NAS464 bolt, which in many applications is installed as a replacement for and AN3 fastener, there are differences in diameter tolerances between the two bolts. Frequently the installation of the NAS464 is very tight and would require some light polishing on the trim tab rod/bearing ID for installation, which seems to be disallowed by verbiage in MEB-27-1. Also if using standard installation practices as required by MEB-27-02 item #5 for castellated nuts, it is normal to install nut until touching and then align cotter key hole to next nut castellation.

Both of these issues will leave the bolt to be too snug to comply with MEB-27-02 "Accomplishment Instructions" Item 5 which states NOTE: "Bolts should be free turning after installation". There is no reason to leave this bolt in a finger loose condition. The fixed tube fork goes over a bearing (#PN3A) with the inner race of more than sufficient length to disallow any crush up of the tube fork. In fact the noted installed looseness often causes assembly in-flight "buzzing" creating rapid bolt and/or rod wear. This installation issue needs to be addressed.

3) The called for NAS464P3-8 bolt is now an obsolete specification. Replacement bolt superseded for these are the NAS6203-8 bolt and due to possible future lack of availability of the old NAS464 bolt it should be allowed to supersede to current specification hardware in the released documentation.

Additional Consideration:

In this application the forward attach bolt (Trim rod to trim tab attach) is installation direction critical in many models, to allow for clearance of the hardware as it passes near or through the elevator front spar cut out. Improper installation can cause jamming of the trim system. This condition should be explained in a cautionary note.

Also nowhere in MEB-27-02 does it require or suggests a post installation run check to identify interference and or proper operation of the control. This should be added.

Thank you for your time in this matter and if any questions arise please feel free to contact me at any time.

Tony Saxton Director of Tech Support - The Twin Cessna Flyer