

ERA21LA106, KEYS 102531
Grumman AA5, SN AA5-0080 Investigation
Accident, 1/19/2021, KJYO
Investigative Plan v02

Aircraft Location: Papillon Air Hangar, KJYO

Aircraft Inspection date: 17MAR2021

Inspection Start Time: 0900hrs

Inspection Completion Time: 1400hrs

1. **Document pitch trim setting at trim tab (tab trailing edge up or down and degrees)**

Item 1 Response:

The Trim Tab, "As Is" position, was found to be located at the mid-range point on the P/N DE 5004-501 Rigging board which was in agreement with the cockpit Trim indication, found to be set to the "T.O." position.

There is no Maintenance Manual, measurement requirement for this position.

(NOTE: During the accident, the L/H elevator had disconnected from its outboard, Bearing Support Assembly attach point and was hanging by the Inboard attach point. Additionally the L/H Elevator Quadrant, tube assemblies had suffered deformation and cracking damage.)

The R/H Elevator was found to be attached at both the Inboard and outboard attach points, however the associated Trim tab had disconnected from its Inboard control arm, and was only attached to the Elevator by its Hinge attachment.

The R/H Trim Tab inboard mount still responded to movement of the Trim adjustment wheel in the cockpit. The Elevator Trim Tab, travel check measurements, were achieved using the R/H Elevator Trim Tab; the Trim Tab had to be held in place, by hand, in line with the position of the Trim Tab Inboard mount/trim input mechanism.

During the Trim Tab travels checks, the Trim Tab position appeared to agree with the cockpit Trim Wheel indication. With Trim Wheel at its full aft rotation, (Elevator full up position), the Trim Tab was found to be at the correct Elevator full up position of 19* +/- 2* down throw, of the Trim Tab. This is in accordance with the Maintenance manual, Ch 27-3-1, Pg 507.

According to the TC holder, and supported by the rigging procedure in the maintenance manual, the achieving of the 19* +/- 2* is the determining spec for the Trim Tab rigging. The other positions are determined by the geometry of the non-adjustable linkage and trim tab arms. (See Picture for travel achieved)

(See attached Pictures for "Inspection Item 1")

2. **Verify current position of Pitch trim indicator in the cockpit (as it is)**

Item 2 Response:

The Pitch Trim Indicator setting "As Is" was found to be at the "T.O." position. Travel checks taken with the P/N DE 5004-501 Rigging board, confirmed the physical position of the Trim Tab which was in agreement with the cockpit Trim indication.

(See attached Pictures for "Inspection Item 2")

3. **Document condition of elevator up and down limit stops with pictures and notes**

Item 3 Response:

The Elevator "Up" and "Down" limit stops were intact and secure.

(See attached Pictures for "Inspection Item 3")

4. **Perform elevator trim tab free play check per MM.**

- a. Also check trim tab arm and actuator for free play (Both sides)

Item 4 Response:

There is no maintenance manual requirement or procedure for a Free Play check for the AA-5 Model. There is a maintenance manual Free Play check requirement for the AA-5A and AA-5B Models, which states the maximum allowable Trim Tab free play is 0.27"

Free play was measured on the accident aircraft, R/H Elevator Trim Tab Inboard mounting bracket (which also serves as the mechanism for transmitting Cockpit Trim Tab adjustment to Trim Tab movement). Using the procedure given for the AA-5A as a guide, sans the use of the hanging weight due to existing control arm and associated parts, damage, free play, was measured, and found to be approximately 0.031". (Ref AA5 Series Maintenance Manual, 27-3-1, Pg 509, 510)

5. **Confirm mass balance weight for both elevators remained installed and properly secured**

Item 5 Response:

Both the L/H Elevator and the R/H Elevator Mass Balance Weights were found to be installed, and secured onto their respective Elevator Horns.

(See attached Pictures for "Inspection Item 5")

6. **Document damage to outboard rib of left horizontal stabilizer and any missing parts by nomenclature and part number.**

Item 6 Response:

- A. L/H Horizontal Stabilizer, Part number 301025-501, is missing aft end section of End Rib. Missing section area fore and aft, measures approximately; 2 7/16" on the bottomside, and 2 3/8" in length at the topside.
This end Rib does not have its own part number, but is part of the Horizontal Stabilizer assembly.
- B. Bearing Support Assembly, P/N 301030-501, is missing from the L/H Horizontal Stabilizer end rib. The assembly mounts to the portion of the Horizontal Stabilizer end rib that is missing from the assembly.
- C. L/H Horizontal Stabilizer, upper surface, at junction of the surface and the outboard most Rib, shows evidence of upper surface debonding from the Rib. The debonding measures approximately 9 1/2", as measured from the upper Horizontal Surface training edge, forward, to the visible termination, of the debonding.
- D. Horizontal Stabilizer, end Rib has an approximate, 7/8" vertical Crack, emanating from the upper edge of the rib at the 7 1/2" location, as measured from the upper Horizontal Surface training edge, forward.
- E. Corrosion noted throughout the interior of the L/H Horizontal Stabilizer and under the bond lines where debonding occurred.

F. Evidence of corrosion, on the outboard surface of the Horizontal Stabilizer outboard Rib, just below and just aft of the forward Lightning hole.

G. Evidence of corrosion, on the outboard surface of the Horizontal Stabilizer outboard Rib, just below and just aft of the aft Lightning hole.

(See attached Pictures for "Inspection Item 6")

7. Measure elevator control cable tension annotating date, time of day and temperature reading

Item 7 Response:

Elevator Cable Tension readings, MM CH 27-3-1, Page 501; Required Cable Tension = 35lbs +0 /- 5 lbs tension

- 1st Tensions taken at 0953hrs, Temperature in Hangar at 69°F, Tensions taken in tail, panel area located, just forward of the tail cone bulkhead: Readings achieved:
Upper Cable = 23 lbs
Lower Cable = 13 ½ lbs
- 2ND Tensions taken at 1153hrs, Temperature in Hangar at 69°F, Tensions taken in cabin, under the aft seat:
Upper Cable = 17 ½ lbs
Lower Cable = 11 ½ lbs

(See attached Pictures for "Inspection Item 7")

8. Without adjusting, determine if elevator is properly rigged (if able for the right).

Item 8 Response:

Conducted Travel Checks for the elevator, using the R/H elevator for the checks, Reference MM CH 27-3-1, Page 501. The Elevator Travels were not in alignment with the manufacturer's maintenance manual, the Elevator Stops were engaged, when the Elevator was at the upper and lower travel limit;

- Maintenance Manual Elevator travel requirements;
NOSE UP = 30° +/- 2°
NOSE DOWN = 20° +/- 2°
- Actual Elevator travel readings;
NOSE UP = 35.0°
NOSE DOWN = 12.2°

NOTE: Potential exists for travel measurements to be skewed due to the geometry of the mechanical motion being affected by the bent and cracked bracketry, reference pictures associated with Inspection Item 10.

(See attached Pictures for "Inspection Item 8")

9. **Determine any wear at any pulleys of the pitch and pitch trim flight control cable pulleys.**

Item 9 Response:

There are no pulleys in the Pitch Trim system, on the AA-5 aircraft.

There are four "Idler" pulleys installed in the Elevator system; inspection of these pulleys revealed no discrepancies.

10. **Remove and retain both horizontal stabilizers and elevators for shipping to the NTSB Materials Laboratory. Photo Document Removal.**

Item 10 Response:

The Horizontal Stabilizers, LH and RH (removed as a single unit). The Elevators have been removed from the Horizontal Stabilizers and are awaiting shipping to VA NTSB Facility.

(See attached Pictures for "Inspection Item 10")

Additional Data Point:

In accordance with the AA-5 Series Maintenance Manual, 5-2-1, pg. 209, item 7:

The Elevator Torque Tube, maximum wear limit at bearing supports is as follows;

.005" - .030" reduction in wall thickness = Incorporation of GAAC Service kit 121A is required

Over .030" reduction in wall thickness = replacement of the control surface is required.

The Torque Tube (Bearing Pin) diameter measurements achieved on the removed L/H and R/H Elevators were as follows:

L/H Elevator: 1.122"

R/H Elevator: 1.123"

In accordance with the Aircraft Manufacturers Drawing; American Aviation Corporation, Drawing number 13-302002, Torque Tube Diameter = 1.125". Torque Tube Wall thickness = .083"