



U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety

*Harrisburg FSDO-EA-13
400 Airport RD Room 10
Harrisburg PA. 17070*

Lucas Winn-Inspector's Statement – Preliminary Accident Investigation

ATQA#: A-EA-13-22-008

NTSB#: ERA22LA195

Registration: N4468X

SAS: EA13202201741

Make: Piper

Model: PA-32-300

Serial Number: 32-7640024

When: March 18, 2022, 1955 EDT

Where: N94, Carlisle Municipal Airport

What: Tail Strike upon Landing Runway 10

Who: Pilot In Command (PIC): David S. Connors

Event: On March 18, 2022, A Piper PA-32-300, N4468X, SN: 32-7640024, experienced a tail strike on landing at Carlisle Municipal Airport (N94) at the conclusion of a part 91 flight from Hagerstown Airport (HGR). There were no injuries among the 6 souls on board. The aircraft sustained substantial damage to the bottom of the tail section, empennage bulkhead, tail tie down ring - attaching structure, and the tail cone.

The pilot stated, on Monday March 18 he took five people plus himself to Hagerstown for dinner. Prior to the return flight, his passengers decided to change their seating locations. He recalculated his weight and balance for full fuel and found he was under gross weight, balance towards the rear of but inside the CG envelope. After topping off all four fuel tanks, the airman took off from Hagerstown around 7 pm local time and proceeded enroute to N94. The pilot obtained the weather from Capital City ATIS, the closest weather observation broadcast to N94. The pilot calculated the crosswind at his destination 170@14kts. The pilot planned on landing runway 10 with a 5 knot headwind / 14 knot crosswind.

The airman stated, he crossed the threshold of the runway, reduced power and held right rudder to maintain the center line. At approximately five feet above ground level the crosswind mostly disappeared and the sink rate increased. The aircraft settled to the runway striking tail first, porpoised three times before coming to a stop. There were no injuries and no damage observed due to darkness.

The following morning the pilot and his mechanic returned to inspect the aircraft, discovering damage to the tail.

Miscellaneous:

Inspectors Lucas Winn and Jerry Wells inspected the aircraft, runway, and conducted a thorough review of the aircraft logs to include current and historical weight and balance data to compare it to the weight and balance conducted on the evening of the incident flight. Inspection of the aircraft revealed substantial damage to the tail tie down point, substantial damage to the lower portion of empennage bulkhead, minor buckling of the two lower aft stringers, damage to the lower aft skin panels with pulled rivets and cracking around the failure points on the bulkhead, damaged empennage bulkhead cover panel, and damage to the lower tail cone with the inability to reinstall the panel or tail cone. Inspection of the runway environment revealed evidence of a tail strike in the form of a 1/8 inch deep scar in the asphalt approximately 4 feet long to the left side of the center line between the far end of the 1000 foot markers on runway 10. Logbook data revealed that a repair station had made a major modification to the aircraft in June of 2020 and incorrectly recalculated the weight and balance data after a weight change of -14 lbs. was applied to the empty weight of the aircraft with no recalculation for oil, optional equipment and unusable fuel. A calculation of the weight and balance using the superseded data showed the aircraft to have been over gross weight with a CG near the aft limit. Weight and balance data is shown below with described adjustments. Review of the PIC logbooks show that the PIC had been issued his private pilot certificate in January of 2022 and has 74 hours total time.

Weight and Balance Data

As calculated in POH

Empty Weight: 1821.0, Arm: 78.5, Moment: 142858

Unusable Fuel: 2.3, Arm: 103.0, Moment: 237

Standard Empty Weight: 1823.3, Arm: 78.5, Moment: 143095

Optional Equipment: 172.0, Arm: 105.4, Moment: 18153

Licensed Empty Weight: 2027.7, Arm: 80.8, Moment: 163838

Oil (12 Quarts): 22.5 Arm: 16.6, Moment: 374

Basic Weight: 2050.2, Arm: 80.1, Moment: 164221

Useful Load: 1349.8

Gross Weight: 3400

This data was hand written and calculated in the W&B section of the POH.

POH Data Recalculated with Calculator

Empty weight calculated with paint, hydraulic fluid, and 2.4lbs of undrainable oil

Empty Weight: 1821.0, Arm: 78.5, Moment: 142948

Unusable Fuel: 2.3, Arm: 103.0, Moment: 237

Standard Empty Weight: 1823.3, Arm: 78.5, Moment: 143129

Optional Equipment: 172.0, Arm: 105.4, Moment: 18129

Licensed Empty Weight: 1995.3, Arm: 80.8, Moment: 161220

Oil (12 Quarts): 22.5, Arm: 16.6, Moment: 374

Basic Weight: 2017.8, Arm: 80.1, Moment: 161594

Useful Load: 1382.2

Gross Weight: 3400

Empty weight calculations based on 14 CFR Part 23.29 as written prior to 05/29/1975. Basic weight calculation in this section meets the Basic Empty weight definition described in present day 14 CFR Part 23.29 and AC 43.13 1B, chapter 10, paragraph 10-2(b). In chapter 10, para. 10-15(g), It is noted that aircraft certificated under CAR-3 (this aircraft was as per the TCDS A3SO), weight of the oil was subtracted mathematically to get the aircraft empty weight at the time of certification. All future weight and balance calculation are supposed to specify if the empty weight is calculated with full or drained oil.

Data Recalculated by Repair Station

Empty Weight: 1821.0, Arm: 80.7, Moment: 146954.7

Remove GTX 327: -3.3, Arm: 70.0, Moment: -231.0

Remove ADF: -6.6, Arm: 70.0, Moment: -462.0

Remove DME: -7.5, Arm: 70.0, Moment: -525.0

Install Stratus ESG: 3.3, Arm: 70.0, Moment: 231.0

Stratus Power: 0.16 Arm: 70.0, Moment: 11.2

Empty Weight: 1807.06, Arm (CG): 80.78, Moment: 145978.9

Useful Load: 1592.94

Gross Weight: 3400

This is the weight and balance data used by the pilot to calculate his weight and balance prior to departure on the accident flight. This was signed by the certificated 14 CFR Part 145 Repair Station and used the empty weight of the aircraft without unusable fuel, full oil and optional equipment.

Repair Station Data Recalculated with POH Weights

Basic Empty weight: 2017.8, Arm: 80.1, Moment: 161594

Remove GTX 327: -3.3, Arm: 70.0, Moment: -231.0

Remove ADF: -6.6, Arm: 70.0, Moment: -462.0

Remove DME: -7.5, Arm: 70.0, Moment: -525.0

Install Stratus ESG: 3.3, Arm: 70.0, Moment: 231.0

Stratus Power: 0.16 Arm: 70.0, Moment: 11.2

Basic Empty Weight: 2003.86, Arm: 80.15, Moment: 160618

Useful Load: 1396.14

Gross Weight: 3400

This recalculation is the repair stations modification factoring the recalculated POH weight using the Basic Weight including unusable fuel, full oil, and optional equipment as defined in 14 CFR Part 23.29, AC 43.13 1B, and TCDS A3SO. This shows a useful load discrepancy of 196.8 lbs.

Pilots Data Recalculated

Empty Aircraft: 2003.86, Arm: 80.15, Moment: 160618

Front Seats: 420.0, Arm: 85.5, Moment: 35910

Fuel: 504.0, Arm: 95.0, Moment: 47880

Aft Facing Seats: 320.0, Arm: 118.1, Moment: 37792

Aft Seats: 290.0, Arm: 155.7, Moment: 45153

ACFT Weight: 3537.86, **CG:** 92.5, **Moment:** 327353

Over-Gross: 137.86

Type Certificated CG Range at 3400lbs 91.4 through 95.5

Recalculation of the pilots' weight and balance data from the accident flight using the repair station data recalculated with POH indicated weights shows that aircraft was loaded over gross weight by almost 138 lbs with a negligible change in CG of 1 inch.

Lucas Winn
Aviation Safety Inspector