



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

LANDING GEAR EXAMINATION

WPR19LA060

This document contains 5 embedded photos.

A. ACCIDENT

Location: San Diego, California
Date: December 30, 2018
Aircraft: PA46-350P, N4161X
NTSB IIC: Elliott Simpson

B. EXAMINATION PARTICIPANTS:

Elliott Simpson
Senior Aviation Accident Investigator
National Transportation Safety Board
Western Pacific Regional Office
Los Angeles, CA

C. SUMMARY

Examination of the landing gear was conducted at a hangar on Montgomery Field on February 19, 2019.

D. DETAILS OF THE INVESTIGATION

1.0 Landing Gear Examination

As examined, the airplane was on jacks at the wing lifting pads, and the tail was retained by a chain and weight.

1.1 Main Landing Gear

The left main landing gear trunnion remained attached to the wing spar, the upper section of the actuator had detached from its mounting point. The right main landing gear appeared partially extended; its trunnion remained attached to the wing spar. The actuator remained attached to the upper section of the trunnion, however its piston was bent, and the upper section of the actuator had detached. The break lines sustained damage, preventing an accurate assessment of the brake system however, both wheels could be freely rotated.

1.2 Nose Landing Gear

The nose landing gear appeared partially retracted and rotated, with the wheel showing just below the open gear doors (Photo 1). The oleo strut and trunnion assembly remained attached to the fuselage, the scissor link appeared undamaged, and the steering horn remained attached to the nose wheel. The down spring was intact. The tire appeared firm, and the left side of the tire lip exhibited indication of recent scuffing and material removal when compared to the right edge, which was raised and undamaged (Photo 2). The only damage observed was to the rub lock tang of the steering horn, and its associated roller on the engine mount (Photo 3).

The actuator remained attached to the trunnion, and exhibited 7 1/8 inches of extension (full extension 6 7/8 per Piper) which appeared to indicate full extension (Photo 4). The actuator piston appeared to be locked in the extended position. The upper section of the actuator had broken free from its associated engine mount attach point, and was impinging against the firewall.

Control continuity was established from the foot pedals aft to the rudder, and then from the foot pedals forward to the steering bellcrank, bungee, and steering arm; movement of the foot pedals resulted in appropriate movement of the steering arm.

The actuator along with the damaged upper engine mount components was removed for further examination. With the actuator removed, the nose landing gear trunnion fell forward, and the gear fell and locked into place with the aid of the down spring (Photo 5). In this mode, the steering arm made contact with the steering horn and rollers, and no significant play was observed. Movement of the foot pedals now resulted in turning movement of the nose wheel.

Damage to the engine mount structure prevented an accurate assessment of the rake angle. Experimentation revealed that a 1-inch aft movement of the nose gear, brought the steering arm away from the horn and roller assembly, thereby allowing for significant play in the steering system.

1.3 Examination Photos



Photo1 – Nose Landing Gear



Photo 2 – Nose Landing Gear Tire



Photo 3 – Nose Landing Gear Trunnion



Photo 4 – Nose Landing Gear Actuator Piston



Photo 5 – Nose Landing Gear Extended

Submitted by: Elliott Simpson