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Office of Aviation Safety

Western Pacific Region

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AIRPLANE & ENGINE EXAMINATION

WPR19FA161

This document contains 7 embedded photos.

(12 Pages)

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Hemet, California

June 9, 2019

0938 PDT

Lockwood Aviation, Aircam – N123GN

EXAMINATION PARTICIPANTS

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HISTORY OF FLIGHT

On June 8, 2019, about 0938 Pacific daylight time, an experimental amateur built Lockwood Aviation Aircam tailwheel equipped airplane, N123GN, was substantially damaged when it impacted the runway surface during a takeoff attempt at Hemet-Ryan Airport (HMT), Hemet, California. The commercial pilot was fatally injured. The airplane was registered to and operated by the pilot as a personal flight, conducted under the provision of Title 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed and a flight plan was not filed for the local flight, which was departing at the time of the accident.

Witnesses reported that the pilot had constructed this accident airplane with assistance from his friends over the course of 2 years. The accident flight was the first test flight in the airplane after having recently received a signed authorization from the Designated Airworthiness Inspector to begin Phase I flight testing. The pilot performed a preflight inspection of the airplane and

sumped the fuel tanks before he taxied to the active runway. He lined up the airplane on the runway centerline and rolled slowly for a few seconds before he began his takeoff roll. The tail raised slightly and for a moment before the airplane entered its initial climb. As the airplane approached about 20 ft above ground level, the left wing collapsed and was forced upward. The airplane immediately rolled to the left and entered a descent before it impacted the ground inverted.

A video of the accident was captured by an eyewitness who was recording the initial flight with a smart cellphone. The video showed the tailwheel lift from the runway surface about 200 ft into the airplane's ground roll. The airplane lifted from the runway surface about 400 ft into the ground roll and entered a normal climb. Two seconds after the airplane departed, the left wing collapsed and was forced upward. At this time the right wing failed and the airplane rolled slightly to the left side. In the final moment captured by the video, the left wing reached the airplane's zenith and the airplane began a left roll and descended to the ground.

PERSONNEL INFORMATION

The pilot, age 73, held a commercial pilot certificate with a ratings for airplane multi-engine land, airplane single-engine land and instrument airplane. Additionally, he held a private pilot certificate with a rating for airplane single-engine sea. The pilot's most recent third-class medical certificate was issued on June 5, 2018, which did not include any limitations. The pilot had logged about 15.6 total hours in the accident airplane at the time of the accident; of which 7.6 were ground taxi tests.

AIRCRAFT INFORMATION

According to witnesses, the airplane kit was purchased by the pilot/builder in 2017. Federal Aviation Administration records showed that the airplane was registered to the pilot/builder on February 8, 2019. The airplane was powered by two Rotax 912ULS, air cooled, 100 horsepower engines. The left engine was s/n 9569412 and the right engine was s/n 9569347. Maintenance records showed that the airplane's most recent conditional inspection was completed on May 10, 2019 at a total time of 7.6 flight hours. Both engines were mounted on January 20, 2018 and on January 14, 2019 the engines were tested and no anomalies were noted. The airplane's Special Airworthiness Certificate was signed by a Designated Airworthiness Inspector on June 1, 2019 at 7.6 total flight hours.

METEOROLOGICAL INFORMATION

The 1635 recorded weather observation at French Valley Airport, Murrieta/Temecula, California included wind calm, visibility 10 statute miles, temperature 19° C, dew point 13° C, and an altimeter setting of 29.93 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane came to rest on the left runway edge of runway 23, approximately 580 ft from the beginning of the runway (photograph 1). All major sections of the airframe were accounted for at the accident site.

The main wreckage was oriented on a heading of 111° magnetic and inverted on the runway surface. The nose cone was scarred and cracked along the top. Multiple dents and compression wrinkles were observed on both sides of the forward fuselage at the nose cone. The fuselage frame at each wing strut attachment was compressed on both sides of the fuselage.

The left wing was partially separated and folded beneath the main wreckage and the wing tip was adjacent to the empennage. Fuel staining was observed below the left wing on the runway surface along with sand that had been distributed throughout the fuel stain by airport personnel. Both forward and aft left wing struts were resting on the ground next to the left wing (see photograph 1), and both remained connected to the wing. The wing struts were both bolted and torqued with nuts. However, the struts were not connected to their respective fuselage attachment points, which were not damaged (photograph 2). Multiple tears were observed in the sail cloth, which exposed the compression tubes. The wing flap had separated at the left wing and the aileron remained partially attached.

The right wing was intact and exhibited some aft crush damage along the leading edge. Multiple tears were observed in the upper wing sail cloth while the lower wing displayed only paint damage. The center compression tube was bent. A large bend was observed in the flap at the right wing attachment while the right aileron was unremarkable. Both wing struts were attached at both the wing and wing strut attachment fittings. The trailing edge strut was deformed as was the jerry strut that connects both the fore and aft members.

The horizontal stabilizers, vertical stabilizer and rudder were all attached to the empennage. Aft crush damage was observed at the top of the vertical stabilizer and the rudder had separated from the upper guide pin. The elevator trim tab remained attached to the elevator; both airfoils were unremarkable.

ADDITIONAL INFORMATION

Airframe Examination

The airplane was recovered to a secure hangar at HMT where it was examined on June 10, 2019 by a representative of the kit manufacturer with oversight from the National Transportation Safety Board Investigator-in-Charge and the FAA.

Flight Controls

Flight control continuity was confirmed from the rudder, elevator, and right aileron to the cockpit controls. Left aileron continuity was traced from the control surface to the cockpit through a fracture in the aileron push/pull tube and a fracture of the control tube at the wing root. The wing flap actuator was 4.25" exposed, consistent with 5° of downward deflection. The elevator trim

tab showed slight nose-up trim deflection and the jackscrew measured 5/8" exposed, consistent with a neutral trim position.

Fuel System

The right wing fuel tank was breached and the left wing was intact. Several ounces of fuel that resembled 100 low lead aviation grade gasoline were drained through the left fuel tank gascolator. The fuel screen displayed some white residue, but the screen was not obstructed. The right wing gascolator contained a few ounces of fuel that resembled 100 low lead aviation grade gasoline. The fuel screen did not display any debris and the fuel bowl was unremarkable.

Seat Belts

Both the front and rear seats were equipped with Hooker Harness 4 point restraint systems. The forward seat shoulder straps were affixed to the forward center wing via two cables. The rear seat shoulder straps were attached to center wing above the baggage compartment via two cables. The rear seat lap belts were attached to the floor by a loop connected to a bolt. According to the kit manufacturer, the build manual requires the lap belts be connected to eyebolts and mounted to the floor. The front seat lap belt was attached to bolts in the right and left side fuselage via loops.

Left Wing Struts

The forward and aft left wing struts were attached at the leading and trailing edge midspan wing brackets. The kit manufacturer noted that they had been correctly assembled at the wing using AN-4 bolts that had been properly torqued. The forward and aft wing strut inside diameter thicknesses were measured at the wing strut attachment fitting ends without making any adjustments. The aft wing strut measured 31/32" in thickness and the forward wing strut measured 15/16", which were both interference fits with the wing strut attachment fittings (photographs 3 & 4). It was noted that the thickness of the wing strut attachment fittings were precisely 1" thick, consistent with manufacturer specifications.

The wing strut bolts were removed and the struts were placed on the wing strut attachment fittings. Both strut bolts were inserted into the struts outside of the attachment point bolt holes and ratcheted down. Two investigators, pulling simultaneously, were unable to pull the struts from the wing strut attachment fittings. The struts were then re-installed in accordance with the manufacturer's rigging manual and compared to their original installation (photograph 5). Photographs 6 & 7 show the amount of exposed strut.

Engines and Propellers (overview)

Both engines remained attached to the airframe and displayed minimal damage. The carburetor that services cylinder nos. 1 & 3 for the left engine had been fractured at the butterfly flange. Additionally, the same carburetor for the right engine displayed damage at a mounting bracket. Disassembly of the abovementioned left engine carburetor revealed that the idle jet, air screw and main jet were clear. The air screw was set to 1.5 turns, consistent with manufacturer

specifications. The right engine carburetor that services cylinder nos. 1 & 3 was not disassembled.

Throttle control continuity was confirmed from the cockpit throttle control lever to the right engine. The right engine throttle cable had separated at the throttle quadrant, but line continuity was traced to the carburetor through a crimp in the splitter that prevented movement.

Both propeller hubs were intact and attached to their engines. Two propeller blades to the left engine were separated inboard and one propeller blade to the right engine was separated at the wing root. One propeller blade to the left engine and one propeller blade at the right engine displayed some chordwise striations, the blade tips had separated and both blades were split. The remaining right engine propeller blade exhibited some nicks, but was otherwise unremarkable.

Both engines sounded smooth and continuous when functionally tested.

Additional Notes

The kit manufacturer reported that the left wing push/pull tube had been improperly connected to the bell crank. In a normal configuration, the push/pull tube is connected to the bottom of the bell crank. In this application, the tube was connected to the top of the bell crank. Further, a cable had been coiled up and placed in the aft electrical compartment behind the baggage section on top of the elevator cable. According to the manufacturer, the pitot tube was located below the nose cone too close to the hull.



Photograph 1: Accident Airplane at Rest



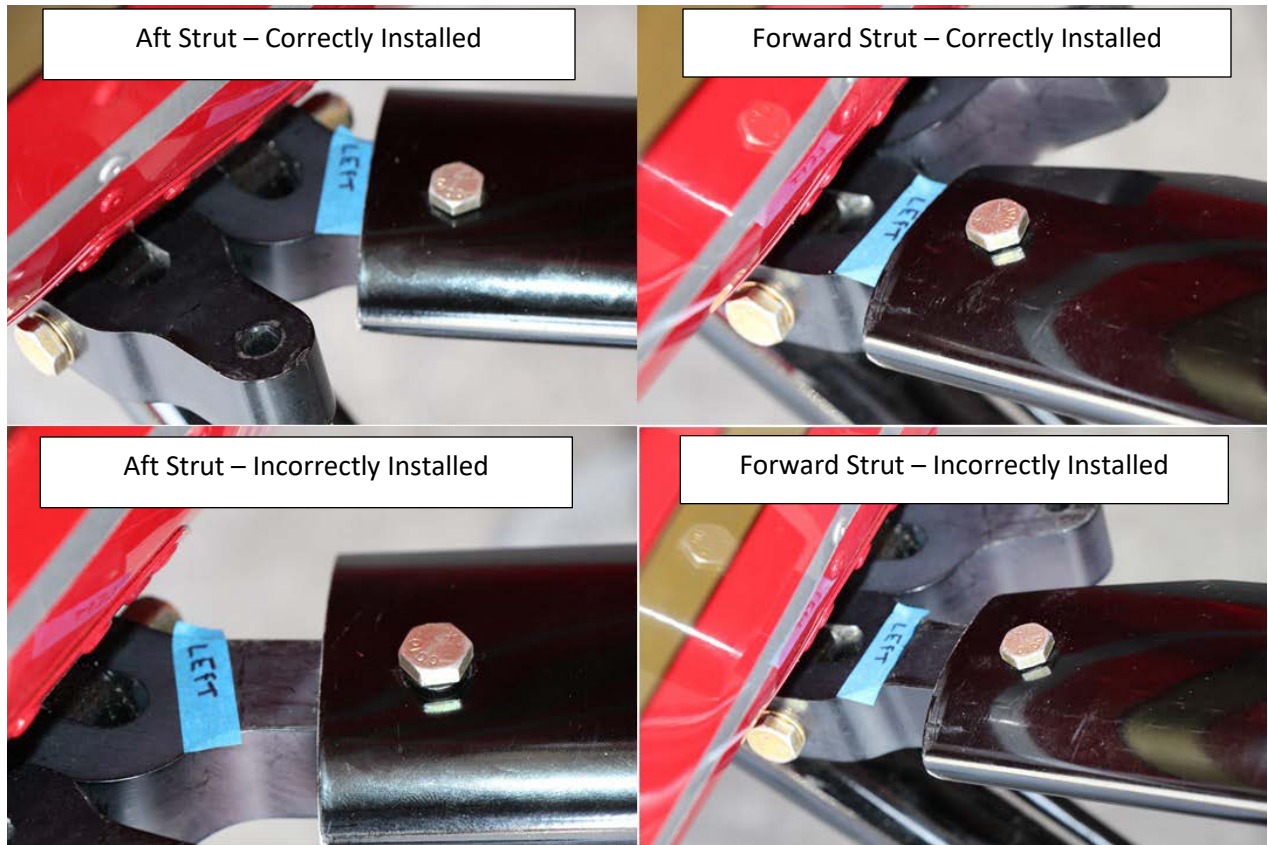
Photograph 2: Left Wing Strut Attachment Fittings



Photograph 3: Left Wing Strut (Forward)



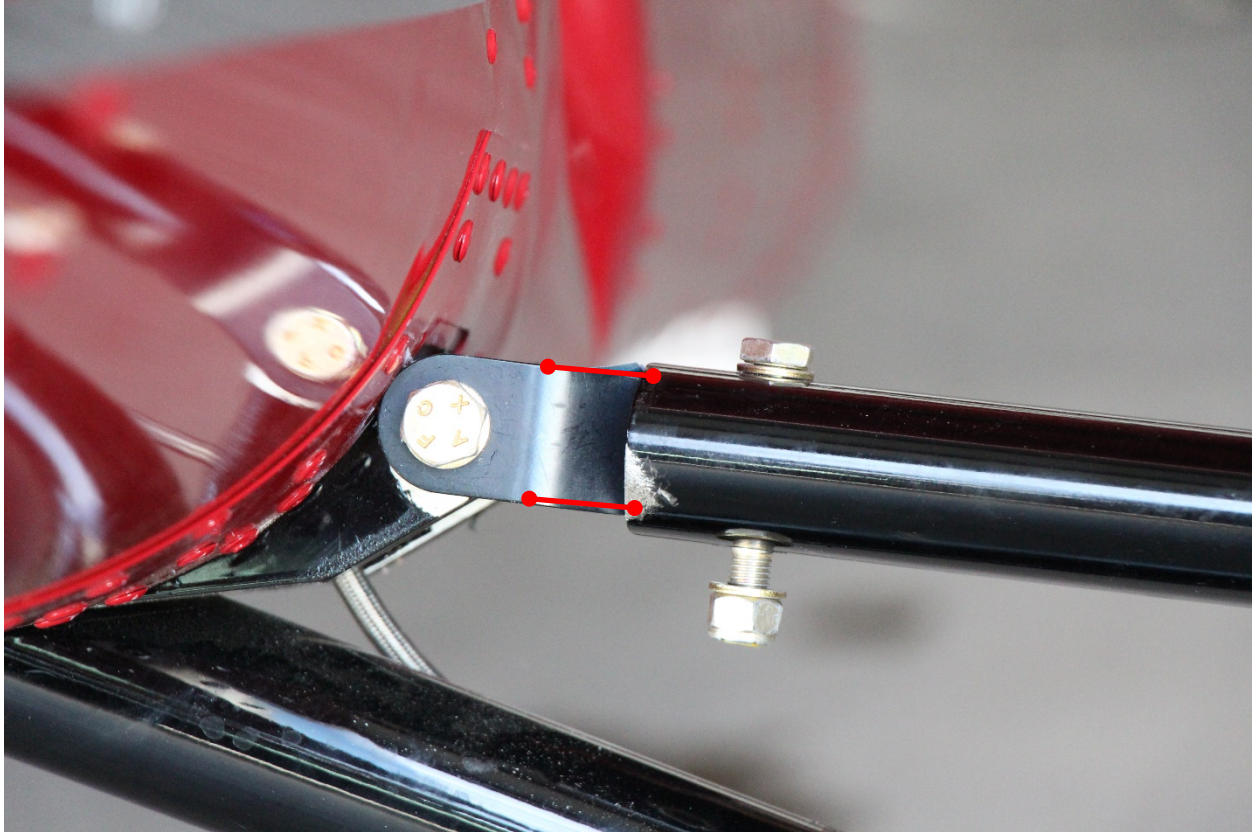
Photograph 4: Left Wing Strut (Aft)



Photograph 5: Left Wing Struts – Correctly and Incorrectly Installed



Photograph 6: Photograph of Left Wing Strut taken By Accident Pilot dated January 16, 2019



Photograph 7: Left Wing Strut Correctly Installed