NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Western Pacific Region

AIRFRAME AND ENGINE EXAMINATION

WPR13FA430

This document contains 11 embedded photos.

Exam Location:

On-scene Examination
9.30.2013
Santa Monica Airport, CA

Follow-on Examination
10.30.2013
Air Transport, Phoenix, AZ

Participants:

Van McKenny	NTSB
Eliot Simpson	NTSB
Charles Johnson	FAA
Ricardo Ansensio	Cessna
Chris Green	Williams Intl

Accident Location:

City:	Santa Monica, CA
Latitude/Longitude:	34 00.94N / 118 27.07W
Elevation:	177 feet mean sea level (msl)

Circumstances/Terrain:

Cessna 525A Citation was landing on runway 21 at Santa Monica Regional Airport. It drifted onto the right side of the runway, then continued to veer off the runway. It impacted the 1,000 foot remaining marker with the right main landing gear, continued in a extreme turn to the right and into a row of hangars. The airplane's right wing impacted the structural column between hangars 302 and 303. The airplane continued to travel into hangar 303, collapsing the wall between the two hangars, wrapping the dividing wall around the fuselage, and collapsing the roof. A post impact fire erupted. Crash fire/rescue arrived and extinguished the fire.

Examination of the runway revealed tire rubber marks that aligned with the airplane's path. No debris on the runway was found, and no tire or wheel fragments were found. The departure end of runway 21 had no overrun area, and drops steeply down to a road 50 feet below and residential housing below that. The area to the left/south of the departure end of runway 21 consisted of an airplane parking apron area next to the American Flyers FBO which drops off to the south approximately 50 to a road and residential housing. The area to the right/north of the departure end of runway 21

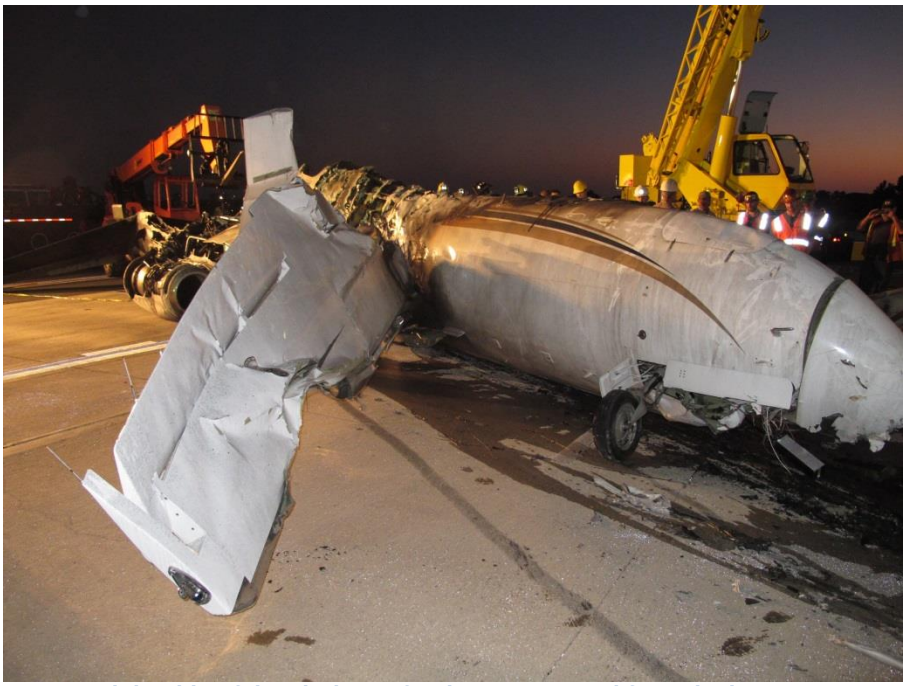
consisted of an embankment that raised up 20-30 feet above the taxi way, behind a parking apron and last row of airplane hangars.

Examination Summary:

The airplane was extracted from the collapsed hangar structure. The fuselage had separated from the wing structure in scissor fashion. The fuselage had rotated counter clockwise about 60° around the longitudinal axis so that the cabin door was pointed towards the ground. The pilot was located in the left front seat, an adult female passenger was in the right front seat, an adult female was located with her back against the cabin door, and an adult male was sitting in a right hand seat mid cabin. One large dog and two cats were located in the aft cabin area. The tail section aft of the pressure bulkhead was exposed to extreme heat/fire.

The fuselage, tail section, engines, and wing structure were laid out for in depth examination and documentation. A thorough search of the airplane's cabin area did not locate the airplane's maintenance records or pilot log book. The flight manual and various operating manuals were found located with in various cabinets in the cabin. The aft section of fuselage, tail section, engines, and wing structure were damaged by extreme heat and fire. The landing gear was fully extended and the tires/wheels were attached. The parking brake handle was in the fully disengaged position and the ANTI SKID switch was set to ON. Bore scope examination of the engines revealed smoke, soot, ash ingestion suggesting both engines were operating during and after the airplanes impact with the hangar and subsequent fire.

Wheel brakes, anti-skid brake module and control box were removed for further examination. EGPWS and cockpit annunciator panel was removed for further examination.



1- Right side of the airplane after it was removed from the hangar.

Airframe:

- Nose gear was extended. The wheel and tire were attached to the fork. The left fork was fractured at the wheel hub. The fracture surface was granular and bright. Nose wheel steering cables connected and continuity verified by moving nose wheel left and right and observing rudder pedals move in concert. Nose tire pressure: 90 psi (recorded Oct 3)
- The center fuselage/wing root area was consumed by fire
- The forward cabin & cockpit area had heat and smoke damage. The cockpit overhead was destroyed by fire, and the windscreen was in pieces resembling a sheet of opaque pellets.
- The right side emergency escape window/hatch was attached to the hinge point.
- The main cabin door was latched
- Cockpit seats:
    - Left cockpit seat – belt unbuckled
    - Right cockpit seat - belt unbuckled.
    - Left cabin seat by main cabin door seatbelt buckled in stowed position.
    - Aft 4 seats damaged by fire, seatbelt condition undetermined.

- Right Wing

    - Wing separated from the fuselage at the attach points
    - Right hand wing (wing spar) broken at the outboard wheel well rib.
    - Leading edge impact to outboard section of the wing at the fuel filler cap.
    - The inboard 8 feet of wing was damaged by extreme fire and heat.
    - 3 ft x 2 ft elongated hole was over the main landing gear wheel well
    - Ailerons and flaps were present on the wing. Aileron cables were traced from the aileron bell crank to the centerline bell crank. The aileron bell crank was connected to aileron.
    - Flap actuator was attached to flap. The flap actuator was fully extended. Flap was separated from the wing. Speed brakes/spoilers deployed
    - Right main landing gear extended. Wheel and tire attached. Tire inflated, no bald or flat spots on tire tread observed. Brake wear looked unremarkable. Tire pressure was 98 psi (recorded Oct 3).
    - 15 ft of wing tip separated from wing at the landing gear wheel well. The separated wing structure was not fire damaged. The spoiler was deployed, but had been cut through by recovery personnel to move the wing.

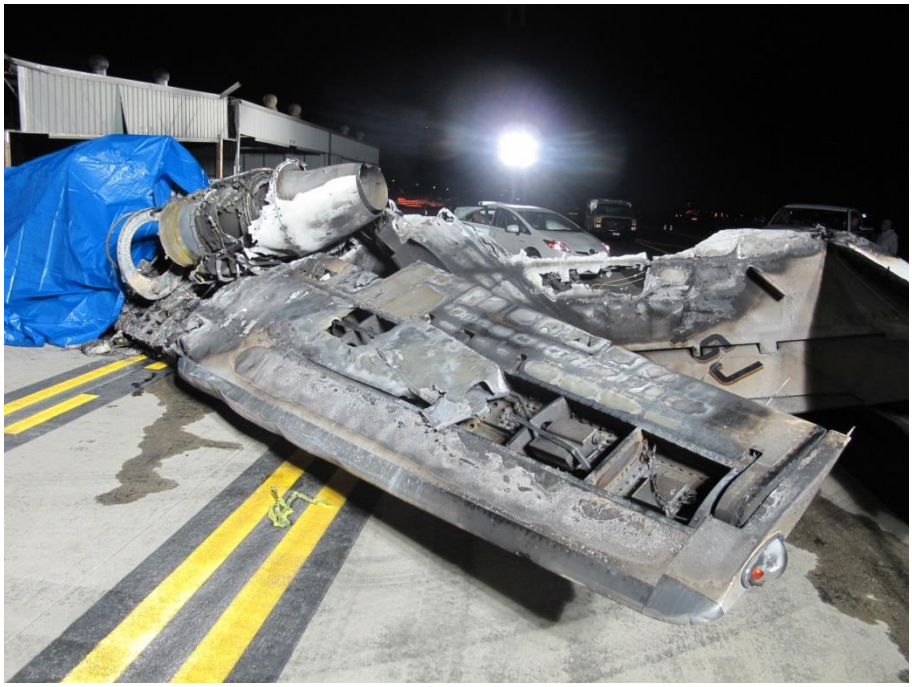
2- Right wing

- Tail Section
    - Tail section aft of the rear pressure bulkhead separated from airframe due to extreme fire damage.
    - Both engines remained attached their engine mounts
    - ELT - ACR Electronics, TSO C126/C142, SN 357585-075, activated and was transmitting after the accident. Signal received by AFRCC.
    - No leading edge damage to horizontal stabilizer.
    - Elevators in place on the horizontal stabilizer. Elevator position was down and the control cables were stretched taunt.
    - Vertical stabilizer leading edge destroyed by fire
    - Rudder present on the vertical stabilizer, rudder positioned to the left.
    - Flight control cables to the tail visible, fire bottles present, environmental ac components observed.
    - The vertical stabilizer, rudder, and horizontal stabilizer & elevators were separated from the main wreckage by recovery crew. Elevator and rudder remained attached to the horizontal and vertical stabilizers

3- Right side of the tail.

4- Rear view of the tail (horizontal stabilizer)

- Left Wing
    - Flap was attached to the wing and extended (deployed).
    - Spoiler/Speed Brake attached to wing and deployed
    - Slight leading edge denting
    - Wing discolored black and gray - heat damage
    - Extreme fire damage at the wing root. Heat and fire damage outboard of wing centerline.
    - Left tire was on the wheel, and wheel attached to the main mount strut. Tire inflated, and heat damaged, no flat spots observed. Landing gear in the down position. Tire pressure: 102 psi (recorded Oct 3).
    - 4 ft x 2 ft hold above the wheel well
    - Aileron attached to wing. Aileron cables attached to aileron bell crank and traced to the center of the fuselage.



5 - Left wing

Cockpit:

- All occupants were unbuckled from their seat belts
- Both cockpit seats were in the full aft position. Seat belts were not buckled.
- Fire extinguishers were found discharged and the activation pins not present.
- Right rudder pedal was forward of the left pedal in both sets of rudder pedals
- Instruments
    - Garmin 530 (2x)
    - Collins Pro-Line 21 (center console)
    - Attitude gyro - 5° right bank
    - Altimeter - 1,000 ft, 29.96 inHg
    - Differential pressure - 1
    - AOA - 10
    - Amps - 0
    - Amps - 40
    - Volts - 6
    - Gear handle - down
    - Parking brake - IN (brake handle corresponded with parking brake valve rod position)
    - Throttle - Left 1/4 forward (idle), Right- 1/3 forward
    - Flap - Handle full down (ground operation) position, indicator showed- UP (unreliable indication - cabled pulled)
    - Aileron trim - indicator full left (unreliable- cable pulled)
    - Elevator trim indication showed takeoff trim set
    - Rudder trim - indicator full left (unreliable- cable pulled)
    - Anti Skid - ON
    - Speed brake – EXTENDED
    - Attenuation switch - AUTO
    - Annunciator panel was heat damaged. Annunciator module was removed for further examination
    - Emergency brake handle - IN

6 – Cockpit, view from above looking down

7 - Cockpit, view from the cabin looking forward

Engines:

- Engines were due for Check 3 in December 2013
- Last maintenance was 7 Sept - Williams Total Assurance Program (TAP).

- Left Engine
  - Williams International FJ44-2C
  - SN 126257
  - TSMO- 1932.8
  - Fuel control cables connected to the fuel control (FCU) - position consistent with throttle position.
  - No rotating components exited the engine case
  - Bleed valve was movable
  - Inlet not present - destroyed by fire
  - N1 section seized
  - Bypass duct melted
  - Intake fan (N1) blades clean
  - Fuel line severed
  - HP compressor rotated by hand.
  - Bore scope examination of the HP compressor (N2) showed soot and small particulate matter compressor section.
  - External heat damage observed at the center of the engine case (by the burner section). Molten holes in the aluminum located at the 12, 11, & 1 o'clock positions.
  - No damage observed on the turbine section.
  - Engine outer nozzle melted and deformed.
  - Attenuator seized in the deployed position.

8 - Left Engine

9 -Left Engine Intake

- Right Engine

  - Williams International FJ44-2C
  - SN 126256
  - TSMO - 1932.8

- Fuel control cables connected to the fuel control (FCU) - FCU positioned to idle.
- Bleed valve was movable
- N1 wheel rotated by hand
- Intake fan (N1) blades were evenly coated with black soot. Induction soot pattern consistent with engine running while ingesting smoke, soot, ash.
- Bore scope examination of the HP compressor (n2) showed soot and small particle debris in compressor section.
- External heat damage at the center of the engine (burner section) at the 1 o'clock position.
- Attenuator connected to linkages and actuator, could be moved by hand. Position at the time of impact could not be determined.

10 - Right Engine

11 - Right Engine Intake