

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

October 27, 2011

Group Chairman's Factual Report

STRUCTURES

DCA11MA075

A. ACCIDENT

Operator: Omega Aerial Refueling Services
Location: Point Mugu, California
Date: May 18, 2011
Time: 1727 Pacific Daylight Time (PDT)
Airplane: Boeing 707-321B, Registration Number: N707AR, Serial #: 20029

B. STRUCTURES GROUP

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C. SUMMARY

On May 18, 2011, at 5:27 pm Pacific Daylight Time (PDT), a modified Boeing 707, registration N707AR, operated by Omega Aerial Refuelling Services as flight 70, crashed on takeoff from runway 21 at the Point Mugu Naval Air Station, California (KNTD). The airplane impacted beyond the departure end of the runway and was destroyed by post-impact fire. The three flight crewmembers received minor injuries.

D. DETAILS OF THE INVESTIGATION

1.0 Aircraft Description

Registration Number	N707AR
Aircraft Serial Number	20029
Aircraft Manufacturer	Boeing Commercial Airplanes
Aircraft Model	B707-321B
Engine Manufacturer	Pratt and Whitney
Engine Model	JT3D-3B
Aircraft Year	1969
Airworthiness Certificate	Special
Approved Operations	Part 91 Public Use
Aircraft Type	Fixed Wing Multi-Engine
Engine Type	Turbo-fan
Aircraft Category	Experimental
Number of Engines	4
Number of Seats	24
Max. Gross Weight	321,000 lbs
Total Time	47,856 hours
Total Cycles	15,186 cycles
Type Certificate	4A26

2.0 History of Flight

The observed debris field extended 4,120 feet on a heading of 218 degrees. The first pieces of wreckage found along the debris path were fragments of the number two (left inboard) engine pylon; they were just past taxiway Alpha 2, about 7,500 feet from the beginning of runway 21. The number one engine (left outboard) nose cowl was about 450 further into the debris field and left of the runway surface in the grass infield. The number two engine nose cowl was near the runway arresting gear on the left side of the runway at the 8,500 foot point. The number two engine was about 230 feet further, and on the left side of the runway surface. The airplane departed the asphalt surface near taxiway Alpha 1, which was 9,500 feet from the departure end of the runway. Ground scars continued through the grass infield to taxiway Alpha at the end of the runway. The number one engine was in the grass infield near taxiway Alpha. The main wreckage came to rest in a wetland marsh left of the runway overrun, and caught fire. Fire consumed the top of the cabin and the cockpit. The main wreckage consisted of the cockpit, cabin, and right wing with the number three (right inboard) engine partially attached, empennage, and the inboard half of the left wing, which sustained thermal damage and was under water. Scattered debris aft of the main wreckage included the nose gear, remnants of the burned outboard left wing, right main landing gear truck, and number four (right outboard) engine.

3.0 Accident Site

The airplane departed Naval Base Ventura County Point Mugu's (KNTD) runway and impacted the terrain after climbing to an altitude of about 20 feet above ground level (agl).

4.0 Fire Damage

The fuselage and left wing were partly consumed by fire.

5.0 Structure

5.1 Fuselage

The airplane fuselage was substantially damaged due to impact with terrain and destroyed by post impact fire. The lower surface of the radome was dented, torn and scraped in the aft direction. The lower fuselage from about stringer 25 left (L) to about 25 right (R) was deformed inward and submerged below the water line of the marsh. The left side of fuselage section 41 from about stringer 17L (cabin floor) to stringer 10R was consumed by fire. The right side of fuselage section 41 from about stringer 10R to about stringer 25R including the window belt showed evidence of fire damage and was leaning inward. Fuselage section 43 from the galley door aft to fuselage station (FS) 600K was consumed by fire from about stringer 18R to about stringer 20L. The fuselage structure from about stringer 18R to 25R and from about stringer 20L to 25L showed evidence of fire damage and was leaning inboard.

The over wing fuselage structure from about FS 600K to about FS 820 and the center wing box were consumed by fire. Fuselage section 46 from about FS 820 to FS 1200 from about stringer 4R to 20L was consumed by fire. From about stringer 4R to 25R the fuselage structure was intact with evidence of fire damage and leaning inboard. At about fuselage section 1200, just forward of fuselage section 48, the empennage separated circumferentially from the forward fuselage. At about fuselage section 1528 the tail cone was partially separated from the empennage.

5.2 Left Wing

A portion of the wing from about wing station (WS) 400 outboard was located approximately 250 feet aft of the main wreckage site. It was resting on the upper wing surface and the lower wing skin, ribs and spars were consumed by fire. The remainder of the left wing from the side-of-body to about WS 400 was in the approximately as-installed location and the upper wing skin panel, ribs and spars were consumed by fire.

5.3 Right Wing

The right wing remained attached to the airplane. The leading edge flaps and slats remained attached to the wing and were in the drooped position. The flaps were determined to be at approximately 14 degrees trailing edge down and the spoilers were in the down position. The upper wing skin between the front and rear spars from the outboard edge of the emergency walkway inboard exhibited evidence of fire damage. The underside of the wing was unavailable for documentation.

5.4 Number One Engine Pylon

The number one pylon (outboard left) separated from the wing at the forward end of the over wing fitting, the mid spar fittings, and the lower spar fitting. The number one engine separated from the pylon at the forward and aft mounting points. All of the examined fracture surfaces had features consistent with overstress with no evidence of fatigue.

5.5 Number Two Engine Pylon

The number two engine (inboard left) remained attached to the pylon and the pylon separated from the wing at the over wing fitting, the mid spar fittings and the lower spar fitting. The over wing fitting fractured at about pylon station 252 coincident with the wing front spar. The forward end of the over wing fitting remained attached to the pylon via the clevis and lug arrangement and was free to rotate up and down when manipulated. The rear portion of the forward section of the over wing fitting had a “V” shaped fracture oriented aft. A section of material from the over wing fitting, in the area of the “V” shaped fracture, was recovered from the runway at flag seventeen near the beginning of the debris field. Of the four mid spar fitting fracture faces examined, three displayed cup and cone features consistent with an overload event. The fracture face on the upper tang of the inboard mid spar fitting displayed a flat smooth surface at the transition from the upper and lower tangs to the lug. Located in one corner of the rectangular shaped fracture face was a dark colored area with a smooth appearance and an arced terminus (thumbnail) consistent with fatigue damage. The fatigue region was located at the upper inboard corner of the upper tang. A portion of the pylon containing all of the mid spar fitting fracture faces was removed from the pylon for detailed examination at the NTSB’s materials laboratory (reference Materials Laboratory Report 11-098). The mating section of the inboard mid spar fitting, along with the mating fatigue region was recovered from the left wing of the airplane. The mating outboard mid spar fitting was partially identifiable in the fire-damaged remains of the left wing. The identifiable fitting structure was retained for examination at the NTSB’s materials laboratory. The fractured lower spar fitting contained the attaching pin and portions of the forward drag brace clevis. The remainder of the diagonal brace was not identified in the debris field. All of the remaining fracture faces examined exhibited features consistent with overstress.

5.6 Number Three Engine Pylon

The number three engine pylon was unable to be examined on-site.

5.7 Number Four Engine Pylon

The number four engine pylon was unable to be examined on-site.

5.8 Vertical Stabilizer

The vertical stabilizer had minimal damage and remained attached to the empennage in its normal position. The Q-inlet and HF antenna were undamaged and intact. The paint was blistered and there were scrape marks on both sides. The rudder remained attached to the vertical stabilizer in its normal position and the paint was blistered with scrape marks.

5.9 Horizontal Stabilizer

The left horizontal stabilizer, elevator and tab from about stabilizer station 200 outboard were located in the debris field and sustained impact damage. The underside was unavailable for documentation. The left horizontal stabilizer from about station 200 inboard was intact and remained attached to the empennage in its normal position. The leading edge was dented and fractured in multiple locations along its length and the underside was unavailable for documentation. The elevator and tab remained attached to the horizontal stabilizer and sustained minor impact damage.

The right horizontal stabilizer was intact and remained attached to the airplane. There were two punctures in the upper skin of the stabilizer and one in the elevator. The leading edge was dented and fractured in multiple locations along its length. The elevator and tab remained attached to the horizontal stabilizer and sustained minor impact damage. The underside of both surfaces was unavailable for documentation.

5.10 Passenger Doors

The forward entry door was separated from its attachment points and lying alongside the fuselage. The door exhibited evidence of fire damage and was warped. The door frame was partially consumed by fire. The forward galley door was in its stowed position and showed evidence of fire damage. The door frame showed evidence of fire damage and was leaning inboard. The aft galley door was undamaged and in the stowed position. The door was marked inactive. The aft entry door was in the stowed position and coated in mud. The over wing exits were consumed by fire.

5.11 Cargo Doors

The forward and middle cargo doors were not identified in the debris field. The aft cargo door was attached and displaced inward into the fuselage. The cargo hold was full of debris from the marsh.

Submitted by: Brian K Murphy