Aviation Investigation Final Report

Location:	ORANGE, Virginia	**Accident Number:**	IAD97FA023
Date & Time:	November 16, 1996, 15:00 Local	**Registration:**	N814SW
Aircraft:	Beech 65-A90	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Serious, 8 Minor
Flight Conducted Under:	Part 91: General aviation		

Analysis

The pilot was taking off with 10 jumpers onboard. At the rotation speed of 100 knots, he used elevator trim to rotate the airplane, but it did not lift off the runway. He continued moving the trim wheel violently to pitch the nose up, and attempted to pull back on the yoke, but the airplane collided with rising terrain off the end of the runway. A witness did not see any of the flight controls move during the pilot preflight inspection, and during the takeoff roll, he did not observe a nose up rotation of the airplane. The pilot reported that he removed a single pin control lock from the yoke during preflight. The Beech control lock consisted of two pins, two chains, and a U-shaped engine control lock. The pilot walked away from the wreckage after the accident. No control locks were found in the wreckage. However, the control column shaft exhibited distress signatures on the periphery of the hole where the control lock is installed. No other evidence was found of any other form of mechanical jamming, interference, or discontinuity with the flight controls. Investigators were unable to identify any potential source of interference, other than a control lock, that could have simultaneously jammed both pitch and roll control. According to the airplane's manufacturer, about 3 to 6 degree of trim would have been normal for the airplane's takeoff conditions.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inadequate preflight inspection and his failure to complete the pretakeoff checklist which resulted in a takeoff roll with the control lock in place.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: TAKEOFF - ROLL/RUN

Findings
1. TERRAIN CONDITION - RISING
2. (C) AIRCRAFT PREFLIGHT - INADEQUATE - PILOT IN COMMAND
3. (C) REMOVAL OF CONTROL/GUST LOCK(S) - NOT PERFORMED - PILOT IN COMMAND

Factual Information

HISTORY OF FLIGHT

On November 16, 1996, at 1500 eastern standard time, a Beech 65-A90, N814SW, registered to Fayard Enterprises of Louisburg, North Carolina, was destroyed when it collided with terrain during an attempted takeoff at Orange County Airport, Orange, Virginia. Visual meteorological conditions prevailed and a flight plan was not filed. The certificated commercial pilot and two parachutists were seriously injured, and eight parachutists received minor injuries. The parachuting flight was conducted under 14 CFR Part 91.

The pilot reported that he was not initially scheduled to fly that day because the airplane was grounded the day prior for a flap replacement, and a fuel leak. He said that the fuel had stopped leaking, and this was the first flight after the flap was replaced. He was rushed that morning, and when he arrived at the airport to fly a few loads, he was told he had 10 minutes to get ready. He said ten jumpers witnessed his preflight inspection, and he proceeded to start the airplane and taxi to the end of runway 7. He completed a run-up check successfully. He said:

"...I say to the jumpers, seat belts on and are you ready to play. They scream with joy and we proceed down the runway. It is cold and I have to keep pulling power so I don't over torque the engines. At rotation (100 knots) speed, I pull back on the yoke and the airplane doesn't lift off the runway. I see the numbers and start moving the trim wheel violently to pitch the nose up. I didn't have time to clear rising terrain which I hit with the right main gear. The aircraft, after leaving the asphalt, started rolling to the right. We impacted right wing first and started cartwheeling. Aircraft came to rest belly down with the wings and tail ripped off. 814SW started to burn while jumpers were being evacuated."

In a telephone interview with the pilot, he said that this was his second time taking off on this runway. He said when the airplane was 3/4 way down the runway, and he saw the numbers coming up, he used the elevator trim wheel to raise the nose, but the airplane would not climb. He tried the yoke, but that was stiff. The airplane struck the rising terrain off the departure end of the runway.

The parachutist who was seated in the right seat next to the pilot said:

"...He frantically turned the control wheel (I guess trim control)... ."

A witness said he was preflighting his airplane on the ramp when the jumpers arrived in a van with an auxiliary power unit, gathered around, and entered the airplane which was soon started. He said his preflight was shortened due to a dead battery, and the King Air was

started and gone.

A second witness who was hauling jumpers in a Cessna 182 all morning said: "...I saw and heard the power come up. The aircraft accelerated down center line to end of runway there was no rotation. The aircraft launched from end of rising runway and descended right wing low to impact point... ." He said the pilot walked back to the hangar after the accident.

Another witness who was standing in front of a large hangar on the Northwest side of the airport said:

"...Nearing the end of the runway, the aircraft made a rolling U-turn and departed runway 07 immediately. At no time did I observe the execution of items on the 'Before Take-off' checklist. I also did not see any of the flight controls move in an effort to establish continuity...it approached the half-way point of the runway. The nose never got light or acted as if it wanted to fly off. It continued to accelerate looking firmly stuck to the runway...I never saw the elevator move in an attempt to rotate the aircraft into flight... ."

The accident occurred during the hours of daylight about 38 degrees, 14.83 minutes latitude, and 78 degrees, 02.74minutes west longitude.

PERSONNEL INFORMATION

The pilot-in-command held a commercial pilot certificate with ratings for airplane single and multiengine land, and instrument airplane. He also held a ground instructor rating, and a flight instructor certificate for airplane single engine land airplane. His most recent Federal Aviation Administration (FAA) Second Class Medical Certificate was issued on June 14, 1996. He reported over 1,170 hours of total flight experience including 40 hours in make and model.

WRECKAGE AND IMPACT INFORMATION

The airplane wreckage was located in a field about 900 feet off the departure end of runway 7. The wreckage was examined at the accident site on November 17 and 18, 1996. The examination revealed that all major components of the airplane were accounted for at the scene.

The scatter path of the wreckage was in the general direction of 095 degrees. Initial ground impact scars began 525 feet off the departure end of runway 7. One of the impact scars was similar to the size and shape of the main landing gear wheels.

The nosewheel and left main gear were separated. The wreckage path extended through three fences, where the left outboard wing, right outboard wing, and left elevator separated. The right main gear remained attached to the wreckage. The left inboard wing, right inboard wing, right elevator and fuselage were destroyed by fire. All flight instruments were destroyed.

The flap, aileron, rudder, and elevator trim actuators were measured. According to the Beech representative the measurements corresponded to 15 degrees of flaps, neutral ailerons, 5 degrees left rudder, and 21 degrees down elevator trim. According to Beech, about 3 to 6 degree of trim would have been normal for the airplane's takeoff conditions.

Both propeller hubs and blades were separated from their respective engines. The left engine separated into two sections and was located aft of the main wreckage. Two of the left propeller blades were chipped and twisted torsionally. The right engine remained attached to the wing. The right propeller was located forward of the main wreckage. Two blades separated midspan and one blade was twisted torsionally midspan.

Distortion of the control wheel shaft assembly lock pin hole was observed (See photographs). The flight control support housing cap was found partially destroyed by fire; however, a residual portion remained on the pilot's control wheel shaft. Masking of the control wheel shaft by the support housing cap during the post-impact fire left residual signatures in the area of the control lock pin hole, with dimensions matching those of the support housing cap. The locking pin hole, within the fire-shadowed area on the control column, exhibited elongation. No evidence was found of any other for of pre-impact mechanical jamming, interference, or discontinuity which could have independently or simultaneously jammed both pitch and roll control.

TESTS AND RESEARCH

Both engines were removed and sent to Pratt & Whitney Canada Inc. where they were examined on January 13 and 14 under the supervision of an investigator from the Office of Transport Safety Board of Canada. The examination revealed that both engines suffered severe impact and fire damage. Both engines displayed rotational signatures to the engine internal components which were consistent with the engines developing power at impact. The engines displayed no indication of any pre-impact anomalies or distress that would have precluded normal engine operation prior to impact.

ADDITIONAL INFORMATION

According to Beech, the factory control lock consisted of a U-shaped clamp and two pins connected together with a chain. The U-shaped clamp holds the Power Levers in the idle position, then one pin locks the rudder, and the second pin holds the primary flight controls in the neutral position. Beech recommended, "To prevent taxiing or takeoff with the pins installed, ALWAYS remove them in the reverse order; i.e. Rudder first, Elevator-Aileron next, and Power Lever last.

In a telephone interview, the pilot stated that he had removed the control lock prior to flight and had stowed it under the pilot’s seat. He also stated that he had checked control surface freedom in accordance with the pretakeoff checklists in the pilot operator’s handbook, which was normally stowed between the pilot seat and console. The pilot provided a copy of

checklists for the airplane, which he said were copies of checklists he was using at the time of the accident. Under the "Before Starting Engines" heading on the checklist provided by the petitioner, removing the control lock is addressed but checking freedom of motion of the flight controls is not. All checklists in FAA-approved flight manuals for the 65-A90 (original and as amended) provided by the manufacturer clearly state under the "Before Starting Engines" heading that after removal of control lock, the freedom of the flight controls should be checked.

According to the pilot, their control lock consisted of a single pin for the yoke and a bar for the rudder pedals. Neither the Beech factory control lock nor the control lock described by the pilot was found in the wreckage. Two bolts of size and length similar to the original manufacturer control column shaft lock pins were found in the ashes of the cockpit. However, it could not be determined whether either of the two bolts was related to the nonstandard control lock that the pilot stated was used by Fayard Enterprises, the operator of the airplane.

The airplane wreckage was released on November 19, 1996, to Robert A. Paul, a representative of the owner's insurance company.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	26,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	June 14, 1996
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	1170 hours (Total, all aircraft), 40 hours (Total, this make and model), 1085 hours (Pilot In Command, all aircraft), 50 hours (Last 90 days, all aircraft), 38 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N814SW
Model/Series:	65-A90 65-A90	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	LJ-186
Landing Gear Type:	Retractable - Tricycle	**Seats:**	9
Date/Type of Last Inspection:	July 5, 1996 100 hour	**Certified Max Gross Wt.:**	8800 lbs
Time Since Last Inspection:		**Engines:**	2 Turbo prop
Airframe Total Time:		**Engine Manufacturer:**	P&W
ELT:	Installed	**Engine Model/Series:**	PT6-20
Registered Owner:	FAYARD ENTERPRISES, INC.	**Rated Power:**	550 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	CHO ,641 ft msl	**Distance from Accident Site:**	23 Nautical Miles
Observation Time:	14:45 Local	**Direction from Accident Site:**	240°
Lowest Cloud Condition:	Unknown	**Visibility**	20 miles
Lowest Ceiling:	Broken / 25000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/ None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	0°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	7°C / -8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(W93)	**Type of Flight Plan Filed:**	None
Destination:	(W93)	**Type of Clearance:**	None
Departure Time:	15:00 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	ORANGE COUNTY W93	**Runway Surface Type:**	Asphalt
Airport Elevation:	465 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	7	**IFR Approach:**	None
Runway Length/Width:	3200 ft / 75 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 Serious, 8 Minor	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Serious, 8 Minor	**Latitude, Longitude:**	38.240402,-78.110076(est)

Administrative Information

Investigator In Charge (IIC):	Drake-nurse, Beverley
Additional Participating Persons:	GEORGE BUSH; RICHMOND , VA EDDIE WEBBER; WICHITA , KS
Original Publish Date:	August 29, 2001
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=28122

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