Aviation Investigation Final Report

Location:	HILO, Hawaii	**Accident Number:**	LAX99FA242
Date & Time:	July 4, 1999, 12:46 Local	**Registration:**	N971GA
Aircraft:	Beech 58	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Ferry		

Analysis

In the takeoff initial climb after a 3,000-foot ground roll, the pilot radioed, 'Can't make it,' and that he was returning to land. The airplane impacted the runway 6,300 feet from the start of the takeoff roll and burned. The pilot was hired to ferry the airplane on an FAA issued Special Flight Permit from Japan to Illinois. The pilot held a FAA airframe and power plant technician certificate with inspection authority, and was to supply and install the fuel tank system necessary for the long-range trans-Pacific flight. While en route to Honolulu, he diverted to Johnston Atoll, due to a fuel flow problem from the ferry tanks to the aircraft fuel system. The pilot discussed the problem with the aircraft owner, and the routing of the ferry fuel tank hoses and potential interference by airplane structure and landing gear was discussed as a possible problem area. After an 18-day delay, and prior to departure, the airplane was fueled with 50 gallons of 100LL aviation fuel sent to Johnston Atoll by barge, and 50 gallons of automotive fuel provided by the military. The airplane was then flown to Honolulu, where the pilot locally purchased and installed an additional 45-gallon fuel tank, then on to Hilo. The departure at Hilo was for the estimated 2,023-mile leg to Oakland, California. The airplane was operating in an over-gross weight condition, which was within the authorized ferry flight weight limitation; however, the CG was in excess of 2 inches aft of the aft limit. The CG variance was not authorized in the ferry permit. The left engine was removed and successfully run meeting all Continental test parameters. Disassembly of the left propeller disclosed marks consistent with operation at, or very near, low pitch stop at the time of impact, indicating something less than full power. Automotive type rubber hoses were found routed and draped from ferry fuel tanks to the main gear wheel wells and through the airplane center section. An auxiliary tank hose was found draped through the left landing gear retract brace. The hose had evidence of being compressed by interference with the airplane structure and the gear retract braces. No vapor return line to the left tank was found.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's improper fuel system modifications resulting in inadequate fuel flow to the left engine during a critical phase of flight. Factors in the accident were the operation at an over gross weight condition with a CG more than 2 inches aft of the rear limit.

Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - NONMECHANICAL
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (C) FUEL SYSTEM,VAPOR RETURN SYSTEM - NOT INSTALLED
2. (C) MAINTENANCE,INSTALLATION - IMPROPER - PILOT IN COMMAND

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
3. (F) AIRCRAFT PERFORMANCE,ENGINE OUT CAPABILITY - EXCEEDED
4. AIRCRAFT WEIGHT AND BALANCE - EXCEEDED - PILOT IN COMMAND
5. AIRSPEED - NOT OBTAINED - PILOT IN COMMAND
6. STALL/MUSH - ENCOUNTERED

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Factual Information

HISTORY OF FLIGHT

On July 4, 1999, at 1246 hours Hawaii standard time, a Beech 58, N971GA, operated by General Aviation Services, Inc., of Lake Zurich, Illinois, was destroyed following a collision with the runway during takeoff and initial climb at the Hilo International Airport, Hilo, Hawaii. The airline transport pilot, the sole occupant, received fatal injuries. The airplane was on a ferry flight from Nagoya, Japan, to Rockford, Illinois. This flight leg was destined for Oakland, California, about 2,023 miles northeast. Visual meteorological conditions prevailed at the departure point for the flight operating under the provisions of 14 CFR Part 91 and an IFR flight plan was filed. The aircraft was issued a ferry permit by the Federal Aviation Administration (FAA) for the operation.

The pilot departed Japan May 24, 1999, and arrived at Saipan. He departed Saipan May 25, en route to Phonpei; and departed Phonpei May 26, en route to Majuro. He departed Majuro May 29, and diverted to Johnston Atoll. The airplane remained on Johnston Atoll for about 18 days during which time the original Special Flight Permit dated June 6, 1999, expired. The pilot received a reissuance, with an expiration date of July 9, 1999. While at Johnston Atoll, the airplane was refueled with 50 gallons of automobile gas into the right auxiliary fuel tank. Also added was 50 gallons of 100LL aviation fuel obtained from Honolulu by barge. The pilot departed Johnston Atoll June 18 for Honolulu. At Honolulu the pilot had 25 gallons of automotive gas removed from the right auxiliary fuel tank. The pilot departed Honolulu for Hilo on July 3, 1999.

According to the Hilo FAA Air Traffic Control Tower transcript, on July 4, 1999, at 1247, the pilot was cleared for takeoff from runway 08 at Hilo International Airport. He departed from the 9,800-foot-runway threshold and rotated at 3,000 feet. Subsequent measurements made during the investigation determined that the first scars associated with the airplane (at the impact location observed by witnesses) was 6,300 feet from the start of the takeoff roll. About 50 to 100 feet agl, the pilot announced on the local control frequency "coming, coming, come in for landing, I can't make it sir." According to tower personnel, the landing gear was observed to retract then extend.

The pilot filed an instrument flight plan for 13 hours 10 minutes, with 14 hours 6 minutes of fuel onboard.

PERSONNEL INFORMATION

The pilot held an airline transport pilot certificate. His personal logbook was not recovered. According to his last documented first-class flight physical dated May 3, 1999, he reported a

total of 14,000 flight hours. He also held an FAA ground instructor rating for advanced instrument, and a flight engineer rating for turbojet powered aircraft.

The pilot also held an FAA airframe and powerplant technician certificate with inspection authorization.

AIRCRAFT INFORMATION

The aircraft had been owned and operated by Japan Airlines and the historical Japanese records were not found in the aircraft. The Japanese registration identification (JA5311) was observed on the bottom of the left wing.

During postaccident examination of the airplane there were three separate auxiliary/ferry fuel tanks observed inside the cabin area. There were two side-by-side 110-gallon tanks, and a 45-gallon tank behind, for a total of 438 gallons. The tanks were plumbed into the aircraft fuel system using Rayco-Eastman B708 1/2-inch inside diameter automotive type hose.

An FAA form 337 dated May 10, 1999, for the installation of two 200-gallon aluminum ferry tanks was reviewed. Aircraft ferry fuel system operations and management details were outlined in Attachment No. 1 to the form. Attachment No. 1 lists the tank quantities as 110 gallons each. The two tanks were shipped to Japan and installed by the pilot. The third 45-gallon tank was purchased from an operator at Honolulu, and installed by the pilot. No paperwork has been located for the last installation.

According to his employer, the pilot had called him for installation consultation, and subsequently to discuss problems he was experiencing while en route. The pilot told him that the ferry system would only drain about 2/3 of the fuel from the ferry tanks. The routing of unsecured hoses through the wheel wells and the landing gear retract mechanisms were discussed as a possible source of the problems.

The baggage/cargo, tools, auxiliary tank empty weights, and various items recovered were weighed, or estimated, to obtain an approximate empty weight. That weight, the fuel load of 2,628 pounds, and the airplane's normal empty weight combined for a total gross weight of approximately 6,676 pounds.

According to the FAA approved Airplane Flight Manual, the designed maximum takeoff weight is 5,500 pounds. The published aft center of gravity (CG) limit is 86 inches aft of the datum at all weights. Based on the available evidence, at the time of the accident, the CG was about 88.46 inches aft of the datum.

On May 7, 1999, the pilot obtained authorization from the FAA Wichita Aircraft Certification Office, Small Airplane Directorate, to operate the airplane at an increased gross weight while on a Special Flight Permit. The permit was to expire on June 6, 1999. Excerpts from this authorization stated that the airplane was structurally satisfactory for ferry flight operation at

takeoff gross weight of 6,875 pounds and aft CG limit of F.S. +86 inches, provided structural loads of +2.5 and -1.0 are not exceeded.

It further stated, "The excess weight authorized is limited to the additional fuel, fuel-carrying tanks, and navigational equipment necessary for this particular flight . . . The flight characteristics and performance at this weight/CG configuration have not been determined . . . Increased stall speeds and reduced climb performance will result for this increased gross weight."

METEOROLOGICAL INFORMATION

At 1253, the Hilo aviation surface weather observation system was reporting winds at 350 degrees at 7 knots; visibility 10 statue miles; few clouds at 3,100 feet agl; temperature 79 degrees Fahrenheit; dew point 66 degrees Fahrenheit; and the altimeter was 30.04 inHg.

WRECKAGE AND IMPACT INFORMATION

The first ground scars associated with the airplane were found on the runway 08 left shoulder area about 80 feet from the runway centerline. Scrap markings paralleled the runway along the asphalt shoulder for a distance of 273 feet. The wreckage came to rest about 84 feet from the runway centerline.

Burn marks and soot patterns were found near the initial point of ground contact and continued along the scrap marks to the final resting spot of the airplane. The wreckage was oriented facing the departure point. The empennage, the fuselage aft of the rear baggage compartment, and the right wing and engine nacelle were consumed in the fire. The cabin section was extensively fire damaged. There was fire damage to the left wing root and flap.

The right propeller blades were curled, bent, and twisted with chordwise striations and leading edge damage.

The left propeller blades were examined. One blade appeared to be undamaged with freedom inside the propeller hub. One blade was curled at the tip with leading edge damage and chordwise striations. The last blade exhibited leading and trailing edge damage with a mildly twisted propeller tip. This propeller was shipped to McCauley Propeller Company for examination.

Examination of the nose section revealed three propeller blade strikes to the left side of the nose section. The right side of the nose section revealed asphalt-scraping signatures across the nose baggage latching area.

Postaccident examination of the wreckage revealed rubber hoses routed and draped from the ferry fuel tanks to the main gear wheel wells and through the airplane center section. Manual fuel shutoff valves were found lying free on the cockpit floor and connected into the wing fuel

tank plumbing. An auxiliary fuel tank hose was found draped through the left landing gear retract brace. The hose exhibited transverse compression signatures in the area of the retract brace. No vapor return line was found from the left engine to the left tank.

MEDICAL AND PATHOLOGICAL INFORMATION

On July 6, 1999, the Hawaii County Police Department Medical Examiner performed an autopsy on the pilot. During the course of the autopsy the FAA Civil Aeromedical Institute in Oklahoma City, Oklahoma, obtained samples for toxicological analysis. The results of the analysis were negative for drugs, ethanol, cyanide, and carbon monoxide.

TESTS AND RESEARCH INFORMATION

After the accident the left engine was removed and shipped to Continental Motors at Mobile, Alabama. The engine was installed into a factory test cell for an operational test run. The engine met all Continental test parameters.

The left propeller was removed and shipped to McCauley Propeller Company in Piqua, Ohio. The propeller was disassembled and examined for operational signatures and position at the time of the accident. The examination revealed that the propeller blades were at, or very near, the low pitch stop at ground impact. According to McCauley engineers, the damage was consistent with the propeller operating with some power at the time of impact.

ADDITIONAL INFORMATION

On May 17, 2000 the wreckage was released to the insurance company representative at the direction of the owner.

Pilot Information

Certificate:	Airline transport	**Age:**	51,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	May 3, 1999
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	14000 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N971GA
Model/Series:	58 58	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal; Special flight (Special)	**Serial Number:**	TH-1658
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	Unknown	**Certified Max Gross Wt.:**	5500 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Continental
ELT:		**Engine Model/Series:**	IO-550-C
Registered Owner:	GENERAL AVIATION SERVICES, INC	**Rated Power:**	300 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:	ITO ,38 ft msl	**Distance from Accident Site:**	
Observation Time:	12:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Scattered / 3100 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	350°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	26°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	HILO INTL , HI (ITO)	**Type of Flight Plan Filed:**	IFR
Destination:	OAKLAND , CA (OAK)	**Type of Clearance:**	IFR
Departure Time:	12:47 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	HILO INTERNATIONAL APT ITO	**Runway Surface Type:**	Asphalt
Airport Elevation:	38 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	8	**IFR Approach:**	None
Runway Length/Width:	9800 ft / 150 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	19.690158,-155.079925(est)

Administrative Information

Investigator In Charge (IIC):	Petterson, George
Additional Participating Persons:	JERRY PARROTT; HONOLULU , HI MIKE GRIMES; MOBILE , AL STUART BOTHWELL; WICHITA , KS
Original Publish Date:	May 9, 2001
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=46745