Aviation Investigation Final Report

Location:	Ennis, Montana	**Accident Number:**	SEA06LA114
Date & Time:	June 5, 2006, 19:00 Local	**Registration:**	N24BF
Aircraft:	Beech A36	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	4 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot reported that shortly after takeoff the airplane lost engine power and he elected to land in an open field south of the airport. Post accident evaluation and testing of the mixture control linkage revealed that the metering shaft rotated to the mechanical stop when actuated to the "idle cut-off" position; however, when the mixture control was actuated to the "full-rich" position, the metering shaft rotated approximately 40 percent of potential (full) travel and did not reach the mechanical stop. Further examination revealed the mixture control arm retaining nut was tight, however extensive wear to the serrated mating surfaces of the mixture control arm and metering shaft was observed. The serrated edges had worn smooth and fretting type damage was noted to both surfaces. Maintenance records showed that the airplane's original engine, a Continental IO-520, was removed and the airframe was retrofitted with a factory rebuilt (zero time) IO-550-B in accordance with a Supplemental Type Certificate (STC). The certified airframe and power plant (A&P) mechanic, who performed the maintenance on the airplane, stated the mixture control arm (which was shipped with the engine) was installed in conjunction with the engine conversion.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The loss of engine power during takeoff due to an excessively lean fuel-to-air mixture ratio as a result of excessive mating surface wear between the mixture control arm and metering shaft. A factor was the improper installation of the new engine, which resulted in excessive wear and metering of fuel and loss of engine power. An additional factor was the rough, uneven terrain.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: TAKEOFF

Findings
1. (C) MIXTURE CONTROL,LINKAGE - FAILURE,PARTIAL
2. (F) MAINTENANCE,INSTALLATION - IMPROPER - COMPANY MAINTENANCE PERSONNEL

Occurrence #2: FORCED LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Occurrence #3: WHEELS UP LANDING
Phase of Operation: EMERGENCY LANDING

Occurrence #4: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER
Phase of Operation: EMERGENCY LANDING

Findings
3. (F) TERRAIN CONDITION - ROUGH/UNEVEN

Factual Information

On June 5, 2006, about 1900 mountain daylight time, a Beech A36 Bonanza, N24BF, sustained substantial damage following a loss of engine power and subsequent forced landing approximately two miles south of the Ennis - Big Sky Airport (KEKS), Ennis, Montana. The airplane, which was owned by the pilot, was being operated as a visual flight rules (VFR) cross-country flight under the provisions of Title 14, CFR Part 91, when the accident occurred. The certificated private pilot, and three passengers, were not injured. Visual meteorological conditions prevailed for the cross-country flight that originated from Ennis just before the accident. The pilot's planned destination was Hamilton, Montana.

The pilot reported that shortly after takeoff, the airplane lost engine power and he elected to land in an open field south of the airport. The airplane sustained substantial damage to the firewall during the landing.

On June 27, 2006, representatives from the Federal Aviation Administration (Helena, Montana, Flight Standards District Office) and Teledyne Continental Motors examined the airplane at a hangar facility in Belgrade, Montana.

Functional testing of the mixture control linkage revealed that the metering shaft rotated to the mechanical stop when actuated to the "idle cut-off" position; however, when the mixture control was actuated to the "full-rich" position, the metering shaft rotated approximately 40 percent of potential (full) travel and did not reach the mechanical stop.

Further examination revealed the mixture control arm retaining nut was tight, however extensive wear to the serrated mating surfaces of the mixture control arm and metering shaft was observed. The serrated edges had worn smooth and fretting type damage was noted to both surfaces.

Maintenance records showed that on March 9, 2006, the airplane's engine, a Continental IO-520, was removed and the airframe was retrofitted with a factory-rebuilt IO-550-B in accordance with Supplemental Type Certificate (STC) SA2200SW.

The mixture control arm was shipped with the factory-rebuilt engine. The certified airframe and power plant (A&P) mechanic, who performed the maintenance on the airplane, stated the mixture control arm was installed in conjunction with the engine conversion.

The airplane had accumulated approximately 35 hours since the conversion.

Pilot Information

Certificate:	Private	**Age:**	50,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	April 1, 2006
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	May 1, 2006
Flight Time:	1800 hours (Total, all aircraft), 700 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N24BF
Model/Series:	A36	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	E1736
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	March 1, 2006 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	35 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3465 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	Installed	**Engine Model/Series:**	IO-550B
Registered Owner:	David A. Nicely	**Rated Power:**	300 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	180°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Ennis , MT (KEKS)	**Type of Flight Plan Filed:**	None
Destination:	HAMILTON, MT (6S5)	**Type of Clearance:**	None
Departure Time:	17:00 Local	**Type of Airspace:**	

Airport Information

Airport:	ENNIS - BIG SKY KEKS	**Runway Surface Type:**	Asphalt
Airport Elevation:	5300 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	16	**IFR Approach:**	None
Runway Length/Width:	4694 ft / 75 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	3 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	4 None	**Latitude, Longitude:**	45.271667,-111.648612

Administrative Information

Investigator In Charge (IIC):	Hogenson, Dennis
Additional Participating Persons:	Jerry Byrd ; FAA Helena, Montana, FSDO; Helena , MT Eric Thomas ; Continental Engines; Mobile , AL
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Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=63875