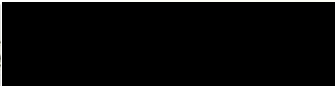




Continental Motors

ENGINE FIELD INSPECTION REPORT

ENGINE MODEL	IO550C-6F converted to IO550B
ENGINE SERIAL NUMBER	824492
AIRCRAFT MAKE & MODEL	Beechcraft A36
AIRCRAFT SERIAL NUMBER	E-1901
AIRCRAFT REGISTRATION	N985CA
FILE NUMBER	16-143

NAME	SIGNATURE	DATE
Mike Council		9-13-2016

ENGINE FIELD INSPECTION REPORT**FILE NUMBER:**

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EXAMINATION		ACCIDENT DATA	
DATE	9-2-2016	NTSB ACCIDENT #	WPR16FA172
FACILITY	Faeth Aircraft	NTSB INVESTIGATOR	Mike Huhn
ADDRESS	[REDACTED] [REDACTED]	FAA INVESTIGATOR	Lee A. Oscar
		ACCIDENT DATE	8-30-2016
		ACCIDENT LOCATION	Sparks, NV

ENGINE INFORMATION

ENGINE POSITION	Single
TOTAL TIME	Undetermined
TIME SOH	997.09 according to worksheet associated with the last annual/100 hour inspection (work order 13284) dated 10-12-2015.
TYPE & TIME SLI	100-hour inspection dated 11-17-2015. Time since inspection was undetermined. Tachometer was destroyed by post impact fire.
BUILD DATE	4-18-2005
IN SERVICE DATE	Undetermined

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INSPECTION WITNESSES

NAME	Mike Council, ASI	NAME	Andrew Hall, ASI
ADDRESS	[REDACTED], Mobile, Alabama	ADDRESS	[REDACTED] [REDACTED] Wichita, KS 67215
ORGANIZATION	Continental Motors	ORGANIZATION	Textron Aviation
PHONE	[REDACTED]	PHONE	[REDACTED]
NAME	Mike Huhn, IIC	NAME	Jack Vanover, ASI
ADDRESS	Western-Pacific Region	ADDRESS	[REDACTED] [REDACTED] Federal Way, WA
ORGANIZATION	NTSB	ORGANIZATION	NTSB
PHONE	[REDACTED]	PHONE	[REDACTED]

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EXTERNAL INSPECTION OF ENGINE

The engine data plate indicated that the engine was converted from an IO550C to an IO550B, which is the correct engine model for the Beechcraft Bonanza application. The engine maintenance logbooks have not been presented for inspection as of the date of this report.

The engine driven alternator separated but remained attached to its respective electrical wiring. The left and right magnetos separated and were discovered in the wreckage path within three feet of the initial point of impact. One magneto drive gear was found near the initial impact site. The second magneto drive gear was found embedded in debris near the engine data plate on the upper right crankcase half. The magneto mounting rings failed at the hold-down brackets. The ignition leads were thermally distressed and separated due to impact stresses. The fuel flow transducer also separated and was discovered near the initial point of impact.

The engine crankcase halves were intact with the exception of the lower forward portion, which separated exposing internal components. With the lower forward crankcase material missing, the # 6 connecting rod was exposed which exhibited a forward bending motion along the length of the connecting rod. This motion suggests that the crankshaft was forced rearward during the impact sequence. The crankshaft propeller flange separated and remained with the separated propeller. The forward portion of the damaged crankshaft exhibited an upward and left bending motion. The forward crankshaft main bearing saddle and bearings separated and were found outside of the crankcase forward of the engine. The face gear attached to the forward crankshaft was impact damaged.

All cylinders remained attached to their respective mounts but were impact damaged exhibiting damage to cooling fins. Each cylinder exhibited thermal distress and were heavily sooted. All rocker box covers remained intact with the exception of the number six cylinder. All top sparkplugs remained attached but the upper sparkplug bodies for cylinders 1, 5 and 6 were broken leaving only the base in each respective cylinder.

The fuel manifold valve separated from the upper crankcase backbone but was discovered in the engine wreckage. The manifold valve was disassembled and inspected. The diaphragm was thermally destroyed. All other components of the manifold valve were intact but exhibited thermal distress. No fuel was discovered in the manifold valve.

The engine oil cap and attached oil rod were located in its respective receptacle but not secured. The oil rod cap was found extended approximately 1.5 inches above the closed position. Impact damage was noted on the oil rod cap grips which indicated possible impact damage. No oil was present on the oil rod when removed.

The oil cooler remained intact but was displaced from its mount by impact forces. The spin on oil filter separated but remained attached by its security wire. The oil filter adapter remained attached to the oil pump which was also intact. The engine starter separated from the starter adapter and exhibited heavy thermal damage.

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The engine driven fuel pump received heavy thermal damage. The fuel pump was removed and inspected. The pump could not be manually rotated. The fuel pump drive coupling was intact but slightly bent. The pump shaft exhibited heat signatures and the pump impeller blades were intact but heat damaged.

The engine induction system was impact and thermally damaged. The rear induction wye pipes separated and were not recovered.

The fuel system throttle body-metering unit separated from its engine oil sump mount but was recovered. The control cables remained attached but were cut to facilitate removal of the throttle body-metering unit from the damaged engine. The individual throttle and mixture control arms remained attached and secured.

The exhaust system was impact damaged but remained attached to the individual cylinder port. The collectors were impact damaged as were the mufflers and individual tail pipes.

The engine oil sump was heavily impact damaged. Large portions of the oil sump separated and were discovered in the surrounding debris.

The instrument air pump was removed to inspect the plastic drive gear. The drive gear was found to be thermally destroyed.

The propeller governor was impact damaged but remained attached to its mount. The control arm separated but remained attached to the control cable.

The engine could not be manually rotated manually due to impact damage to internal components.

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SYSTEM****Condition:**

The exhaust system remained attached but was heavily damaged during the impact sequence.

**INDUCTION
SYSTEM****Condition:**

The engine induction system was impact and thermally damaged. The rear induction wye pipes separated and were not recovered.

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IGNITION SYSTEM

MAGNETO "A"

Manufacturer: Slick-Unison Industries

P/N: 653267

S/N: 04070208

Condition: The magneto received impact and thermal damage. The internal components were severely damaged and a functional test was not possible.

NOTE: Both magnetos separated from the engine but were discovered in the wreckage. Position orientation could not be established.



MAGNETO "B"

Manufacturer: Slick-Unison Industries

P/N: 653267

S/N: 04070206

Condition: The magneto received impact and thermal damage. The internal components were severely damaged and a functional test was not possible.

NOTE: Both magnetos separated from the engine but were discovered in the wreckage. Position orientation could not be established.



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IGNITION HARNESS

Manufacturer: Undetermined

P/N: Undetermined

S/N: Undetermined

Condition:

The individual ignition leads were cut and pinched as a result of impact forces and were thermally damaged by the post impact fire.

SPARK PLUGS

Manufacturer: Champion

P/N: RHB32E

Condition:

Top spark plugs were removed and inspected. When compared to a Champion Check-A-Plug chart, the spark plugs appeared to exhibit normal wear and coloration. However, spark plugs from cylinders one, five and six separated leaving only the lower portion inserted into its respective cylinder head. The #3 spark plug exhibited damage to the porcelain electrode insulator.



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FUEL SYSTEM

FUEL PUMP

Manufacturer: TCM

P/N: 646766

S/N: B05EA403R-6

Condition:

The fuel pump remained intact but was thermally damaged. The red arrow points to the fuel pump as found on the engine. The drive coupling was intact but slightly bent. The fuel pump could not be rotated manually due to thermal damage. The fuel pump was disassembled and inspected. Pump blades were found intact.



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THROTTLE BODY METERING UNIT

Manufacturer: TCM

P/N: 645637

S/N: A05AA335A

Condition:

Control arms remained secured and attached to control cables. The unit received thermal and impact damage. The fuel screen was removed and inspected. No contaminations were noted.



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FUEL MANIFOLD VALVE

Manufacturer: TCM

P/N: 646508-14A4

S/N: C05AA328R

Condition:

The manifold valve was both impact and thermally damaged. The diaphragm was thermally destroyed but the fuel screen was clear. No fuel was present.



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FUEL NOZZLES AND LINES

Manufacturer: TCM

Position	#1	#3	#5	#2	#4	#6
Condition:	# 1, 2, 3 & 4 bodies were impact damaged. # 5 & 6 were intact but damaged. # 2 & 4 were open; all others were blocked with debris.					



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LUBRICATION SYSTEM

OIL SUMP

Condition:

The sump was impact damaged with several pieces not recovered.



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OIL FILTER

Manufacturer: Champion

P/N: Undetermined

Condition:

The oil filter separated from the oil filter adapter flange and exhibited thermal damage.



OIL COOLER

Manufacturer: Niagara

P/N: 654572

S/N: L04-2144-941

Condition:

The oil cooler remained attached but received thermal damage



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CYLINDER #1

P/N: 649166

S/N: Undetermined

Head Date: 2/05

Work Orders:

AC 436

Condition:

Cooling fins were impact damaged and the cylinder exhibited thermal damage



CYLINDER #3

P/N: 649166

S/N: Undetermined

Head Date: 4/05

Work Orders:

CC025

Condition:

The cylinder exhibited thermal damage



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CYLINDER #5

P/N: 649166

S/N: Undetermined

Head Date: 4/05

Work Orders:

CB900

Condition:

Forward cooling fins were heavily damaged during impact and the cylinder exhibited thermal damage



CYLINDER #2

P/N: 649166

S/N: Undetermined

Head Date: 3/05

Work Orders:

CB323

Condition:

The cylinder exhibited thermal damage.



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CYLINDER #4

P/N: 649166

S/N: Undetermined

Head Date: 4/05

Work Orders:

CC046

Condition:

The cylinder exhibited thermal damage.



CYLINDER #6

P/N: 649166

S/N: Undetermined

Head Date: 4/05

Work Orders:

CB877

Condition:

The cylinder received impact damage to cooling fins and the rocker box cover separated. The cylinder also exhibited thermal damage.



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CRANKCASE ASSEMBLY

CRANKCASE

Casting
Number:

1-3-5: Undetermined

2-4-6: Undetermined

S/N: Undetermined

Condition:

The lower portion of the crankcase was heavily impact damaged exposing the internal components.



#5 MAIN BEARINGS

P/N: 653547

Date Code: Undetermined

Condition:



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CRANKSHAFT ASSEMBLY

CRANKSHAFT

Forging Number:
Undetermined

S/N: Undetermined

Heat code:
Undetermined

Condition:



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ROD**

P/N: Undetermined

Forging or Serial Number: Undetermined

Condition:

The connecting rod was visible through the breach in the forward crankcase. The # 6 connecting had a bending signature consistent with the crankshaft shifting rearward at impact.



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ACCESSORIES

STARTER

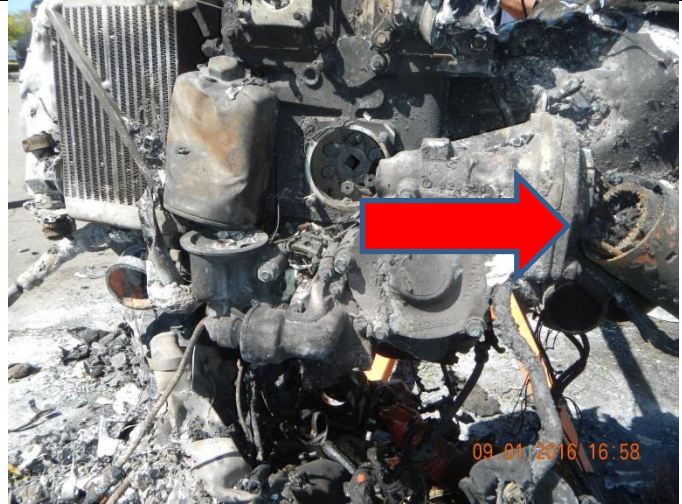
Manufacturer: Undetermined

P/N: Undetermined

S/N: Undetermined

Condition:

The starter partially separated and exhibited thermal damage. The red arrow points to the starter.



STARTER ADAPTER

P/N: Undetermined

Condition:

The starter adapter appeared to be intact but received thermal damage.



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ALT #1

Manufacturer: Undetermined

P/N: Undetermined

S/N: Undetermined

Condition:

The alternator separated from its mount due to impact forces. Electrical cable remained attached.



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VACUUM PUMP

Manufacturer: Undetermined

P/N: Undetermined

S/N: Undetermined

Condition:

The instrument air pump was removed, disassembled and inspected. The plastic drive gear was thermally destroyed. The carbon rotor was broken but the individual blades were intact.



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PROPELLER

PROPELLER
GOVERNOR

Manufacturer: Undetermined

P/N: Undetermined

S/N: Undetermined

Condition:

The governor was impact damage with the outboard section of the housing separated. The control cable remained attached and secured to the control arm. Thermal damage was also exhibited.



PROPELLER

Manufacturer: Hartzell

P/N: Undetermined

S/N: Undetermined

Blade A- S/N:

Undetermined

Blade B- S/N:

Undetermined

Blade C- S/N:

Undetermined

Condition:

The propeller spinner was embedded in an impact crater in the asphalt drive. The blades were partially embedded in the roadway. Blade A displayed a slight rearward bending motion beginning approximately 16" outboard of the blade root. Blade A exhibited the least damage with no leading edge damage and only minor paint transfer from the blade root outboard for approximately 10 inches.

Blade B exhibited cord wise straight scratches from the edge to edge on the rear face of the propeller blade. Blade B also exhibited a forward bend beginning approximately 10" from the blade root with a slight twisting motion beginning approximately 16" from the blade root. Blade C exhibited cord wise straight scratches from the blade root to within 2" of the propeller blade tip. All blades remained attached to the hub and the spinner was crushed inboard due to impact forces.