

Air Safety Investigations Aircraft Incident/Accident Technical Report

Aircraft Incident/ Accident Information	Year: 1965	Make: Beechcraft	Model: 95-B55
	Serial number: TC-946		Registration: N8910U
Location: Chadron, NE		Date: 07-24-19	Time: 1420 MDT
Aircraft Owner		Aircraft Operator	
Damon F. Brown Trustee [REDACTED]		Same as Aircraft Owner	
Report Information			
Senior Air Safety Investigator: Peter J. Basile		Report #: ASI-19-BX-T	Report date: 01-21-20

Airframe

Impact Sequence and Airframe Structure

The aircraft descended into a tree line in a left-wing-low, nose-down flight attitude and then impacted a grass covered field approximately 0.25 NM northeast of Runway 20 at KCDR. The right horizontal stabilizer separated from the aircraft and was found approximately 10' AGL in the impacted tree. The right elevator, with elevator trim tab attached, came to rest at the base of the impacted tree. The left wing struck the ground first and the left wing tip, approximately 3' long, separated from the wing. The outboard section of the left wing, containing the left aileron, sustained tree impact damage and was also separated from the aircraft. The inboard section the left wing, with the flap attached, remained attached to the fuselage. The right wing remained in one piece and was attached to the fuselage. The right flap was hanging downward and remained attached at the outboard flap track.

The vertical stabilizer and the rudder remained attached to the tail. The left horizontal stabilizer, with the left elevator attached, remained connected to the tail. The top of the cabin was removed by first responders and the aft cabin roof was bent aft by first responders to facilitate recovery efforts.



Accident Site

Airframe Systems

Flight Control System Information		
Control lock: Undetermined		
Flight Control Cable Continuity		
Ailerons: See below	Elevators: See below	Rudder: See below
Aileron tab: Undetermined	Elevator tab: See below	Rudder tab: See below
Flap and Trim Positions		
Flaps:	Indicator: Undt	Handle: Undt
	Left actuator: 3.1" = ~10°	Right actuator: 3.1" = ~10°
Elevator trim:	Indicator: Undetermined	
	Left actuator: 1.5" = ~10° down	Right actuator: Undetermined
Rudder trim:	Indicator: Undetermined	Actuator: 3.9" = Neutral
Aileron trim:	Indicator: Undetermined	Actuator: Undetermined

Remarks:

Partial flight control cable continuity was established due to lower forward fuselage compression damage. The elevator trim tab was about 10° tab up, rudder trim was neutral, and aileron trim was undetermined due to impact damage.

Airframe Fuel System Condition, Controls, and Read Outs					
Fuel strainer screen:	Left: Undetermined		Right: Undetermined		
Fuel strainer bowl:	Left: Undetermined		Right: Undetermined		
Main fuel tank gauge:	Left: Empty		Right: Slightly above empty		
Auxiliary fuel gauge:	Left: Undetermined		Right: Undetermined		
Locker fuel gauge:	Left: Not applicable		Right: Not applicable		
Locker transfer:	Left: Not applicable		Right: Not applicable		
Fuel selector handle:	Left: See below	Fuel selector valve:	Left: Left	Fuel boost pump:	Left: Undetermined
	Right: Right		Right: Right		Right: Undetermined

Remarks:

All fuel tanks were breached. There was no detectable odor of fuel at the accident site and there was no fuel blight observed around the wreckage.

The left fuel gauge was impact separated from the instrument panel and was found in the grass next to the fuselage. The left fuel gauge indicated Empty. The right fuel gauge indicated slightly above Empty.



Fuel Gauges

The left fuel selector handle was impact separated. The left fuel selector handle fractured roll pin hole was determined to be aligned with the handle being oriented to the left main fuel tank. The left fuel selector yoke on top of the fuel selector valve was turned using a wrench and the left fuel selector valve was determined to be on the left main tank position.

The damaged right fuel selector handle was removed, and the right fuel selector yoke was turned with a wrench. The right fuel selector valve was found to be positioned on the right main fuel tank.

Approximately 3 ounces of fuel was drained from the right fuel strainer assembly. The left fuel strainer assembly was not examined due to impact damage.



Fuel Selector Valves

Landing Gear System Condition and Controls			
Gear position:	Nose: See below	Left: See below	Right: See below
Actuator position:	Nose: Extended	Left: Extended	Right: Extended
Landing gear selector:	Undetermined		Aux gear control: Stowed
Environmental System Controls and Read Outs			
Cabin heater:	Undetermined	Cabin vent:	Undetermined
Air conditioner:	Not applicable	Oxygen system:	Undetermined
		Oxygen quantity:	Undetermined
Icing System Information and Switches			
Certified into known icing?	No		
Pitot heat:	Undetermined		
	Stall heat: Undetermined		
De-ice:	Surface: Not applicable	Propeller:	Undetermined
Anti-ice:	Surface: Not applicable	Propeller:	Not applicable
		Windshield:	Not applicable
		Windshield:	Not applicable
ELT Information			
Installed? Yes	Manufacturer: Narco	Model: ELT-10	Type: P, AP, AF
Serial number: 26099	Battery due date: 01-20	Armed: Yes	Activated: No

Remarks:

The landing gear were extended at impact. The nose and main gear were impact separated from the fuselage.

Cabin and Equipment/Furnishings

Restraint System Information						
Seat	Occupied	Restraint type	Restraint used	Condition	Manufacturer	
1	Yes	3-Point	Yes	Cut by first responders	Undetermined	
2	Yes	3-Point	Yes	Cut by first responders	Undetermined	
3	Yes	2-Point	Undt	Undt	Undetermined	
4	S/B	See below	See below	See below	See below	
5	S/B	See below	See below	See below	See below	
6	S/B	See below	See below	See below	See below	

Seat Condition Information					
Seat	Orientation	Feet intact	Back intact	Base intact	Rail intact
1	Forward facing	Partially	See below	See below	See below
2	Forward facing	Partially	See below	See below	See below
3	Forward facing	Partially	See below	See below	See below
4	See below	See below	See below	See below	See below
5	See below	See below	See below	See below	See below
6	See below	See below	See below	See below	See below

Remarks:

The seats remained loosely attached to their respective seat rails. Seats 4, 5, and 6 had been removed from the aircraft. The aircraft was packed with camping gear which included, tents, sleeping bags, air mattresses, chairs, clothing, a cooler, and food stuffs. All items were removed from the cabin and nose baggage compartment. The items were weighed using a bathroom scale. The cargo in the cabin weighed 293.6 pounds. The cargo in the nose baggage area weighed 116 pounds.



Cargo in Cabin

Instrument Panel

Navigation Instruments							
Analog primary instruments				Autopilot type: S-Tec			
Suction gage: 0		Magnetic compass: Undetermined		Clock: Undetermined			
	Left side				Left side		
Airspeed:	270 knots		Turn coordinator (airplane):	Left			
Attitude (pitch):	~30° down		Turn coordinator (ball):	Full left			
Attitude (roll):	~30° left		Heading indicator:	~190°			
Altimeter:	9,080'		Heading "bug":	~257°			
Altimeter setting:	29.94 inHg		Vertical speed indicator:	250' up			
Communication and Navigation Radios							
Radio	Control	Active frequency	Stand-by frequency	Radio	Control	Active frequency	Stand-by frequency
Com 1:	Undt	Undt	Undt	Com 2:	Undt	Undt	Undt
Nav 1:	Undt	Undt	Undt	Nav 2:	Undt	Undt	Undt
Obs 1:	Undt			Obs 2:	Undt		
Transponder:	Mode: Undt	Active code: Undt		Stand-by code: Undt			
Electrical Switch Positions							
Master battery: On							
Left alternator: Off				Right alternator: Off			
Avionics 1: On							
Lighting Switch Positions							
Navigation: Undetermined		Rotating beacon: Undetermined		Landing: Undetermined			
Taxi: Undetermined		Strobe: Undetermined		Instrument: Undetermined			
Wing Ice: Not applicable							
Ignition Switch Positions							
Left engine:	Left magneto: On			Right magneto: On			
Right engine:	Left magneto: On			Right magneto: On			

Remarks:

The lower left instrument panel plastic switch identification plate was fractured and separated from the instrument panel.

Powerplant Description

Engine Instruments					
Hour meter: Undetermined					
	Left engine	Right engine		Left engine	Right engine
Tach RPM:	2,425	2,575	CHT:	0	0
Manifold press:	~26 in	~27 in	Fuel press:	0	0
Oil press:	0	0	Fuel flow:	Digital	Digital
Oil temp:	0	0	Ammeter:	0	0
EGT:	Digital	Digital	Voltmeter:	Not applicable	Not applicable
Left Engine Control Positions					
	Cockpit	Engine		Cockpit	Engine
Throttle:	Idle	Undetermined	Cowl flaps:	Not applicable	Not applicable
Mixture:	Cut off	Undetermined	Alt air:	Undetermined	Undetermined
Propeller:	High pitch	Undetermined			
Right Engine Control Positions					
	Cockpit	Engine		Cockpit	Engine
Throttle:	Idle	Undetermined	Cowl flaps:	Not applicable	Not applicable
Mixture:	Cut off	Undetermined	Alt air:	Undetermined	Undetermined
Propeller:	High pitch	Undetermined			
Engine Condition					
	Left engine		Right engine		
Engine attached to airframe:	Yes		Partially		
Propeller attached to engine:	Yes		No		
Engine compression:	Undetermined		Undetermined		
Vacuum pump drive shaft:	Undetermined		Undetermined		
Valve train continuity:	See below		Yes		
Engine Fuel System Condition					
	Left engine		Right engine		
Fuel pump drive shaft:	Undetermined		Undetermined		
Fuel injectors:	Undetermined		Undetermined		
Fuel control inlet screen:	Clean		Clean		
Distribution valve screen:	Clean		Clean		

Engine Magneto Condition						
		Left engine			Right engine	
Left magneto attached:		Yes			Yes	
Left magneto spark:		All leads			All leads	
Right magneto attached:		No			No	
Right magneto spark:		All leads			All leads	
Left Engine Spark Plug Condition (per Champion Check-A-Plug Card)						
	1	2	3	4	5	6
Top	See below	See below	See below	See below	See below	See below
Bottom	See below	See below	See below	See below	See below	See below
Right Engine Spark Plug Condition (per Champion Check-A-Plug Card)						
	1	2	3	4	5	6
Top	See below	See below	See below	See below	See below	See below
Bottom	See below	See below	See below	See below	See below	See below

Remarks:

A Continental Engines investigator examined the engines in the field and again in the hangar at KCDR. The following items were noted:

“Left Engine CS192677-72-L-R

At the accident site on July 25th, the engine remained attached to the airframe and exhibited impact damage. The fuel line from the metering unit to the fuel flow transducer was intact and removed on site at the fuel flow transducer where a few drops of fuel were observed. The engine driven fuel supply line from the fire wall was disconnected at the engine driven fuel pump and between one and two ounces of fuel was drained.

The left engine exhibited impact damage to the oil sump, induction system and exhaust system.

The top spark plugs were removed and the electrodes exhibited light grey combustion deposits and the electrodes were worn out-normal to worn out-severe when compared to the Champion Check a Plug chart.

The fuel manifold valve was partially disassembled and the fuel screen was free of obstruction. The diaphragm was intact and the retaining nut secure. A small amount of fuel was observed in the manifold valves' cavity.

The throttle body/fuel metering unit screen was removed and free of obstruction. Both the mixture arm and throttle arm moved freely by hand from stop to stop.

The cylinder combustion chambers were inspected with a lighted bore scope with no anomalies noted. The bottom spark plugs exhibited signatures consistent with the top spark plugs.

The right magneto was impact separated from its mount but remained attached to the engine by the ignition harness. The left magneto remained attached to the engine and was removed. Both magneto drives were turned using an electric drill and the magnetos produced spark on all ignition leads.

An attempt to rotate the crankshaft using the propeller was limited due to impact damage to the oil sump being crushed upward into the camshaft gears. The crankshaft was rotated about 45 degrees using the propeller and the starter adaptor pulley was observed to turn, as well as movement of the number 6-cylinder exhaust valve and rocker arm.

The valve covers were removed and the cylinder overhead areas did not display any anomalies and a coating of oil was observed.

Right Engine CS192877

On site, the engine was located under the right wing and the right propeller and crankshaft propeller flange were separated from the crankshaft and located in the ground directly in front of and below the right engine. The engine remained attached to the airframe by control cables, fuel lines and wiring.

The engine was recovered along with the rest of the aircraft to the Chadron, NE airport where it was examined on July 26, 2019.

The right engine exhibited impact damage to the oil sump, induction and exhaust systems and some cylinder fins.

The top spark plugs were removed and the electrodes exhibited light grey and dark combustion deposits and the electrodes were worn out-normal to worn out-severe when compared to the Champion Check a Plug chart.

The fuel manifold valve was partially disassembled and the fuel screen was free of obstruction. The diaphragm was intact and the retaining nut secure. A small amount of fuel was observed in the manifold valves' cavity.

The throttle body/fuel metering unit screen was removed and free of obstruction. A very small amount of fuel was observed coming from the metering unit. Both the mixture arm and throttle arm moved freely by hand from stop to stop.

Several of the right engines fuel line fittings were impact fractured which compromised the fuel system.

The cylinder combustion chambers were inspected with a lighted bore scope with no anomalies noted. The bottom spark plugs exhibited signatures consistent with the top spark plugs.

The right magneto was impact separated from its mount but remained attached to the engine by the ignition harness. The left magneto remained attached to the engine and was removed. Both magneto drives were turned using an electric drill and the magnetos produced spark on all ignition leads.

The crankshaft was rotated by hand using a tool on in an accessory gear drive. Continuity from the rear of the engine to the front of the engine and throughout the valve train was confirmed.

The valve covers were removed and the cylinder overhead areas did not display any anomalies and a coating of oil was observed."

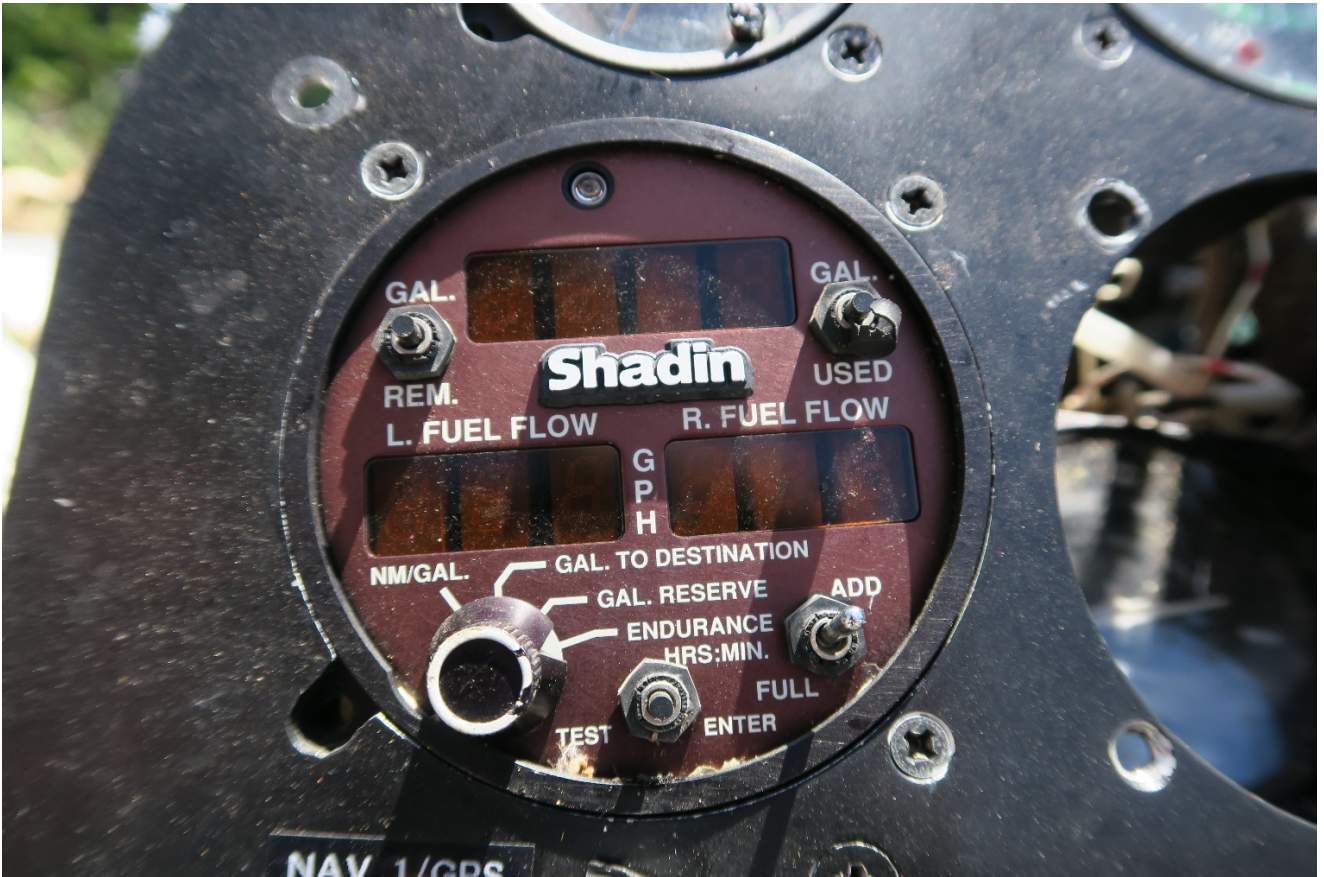
Propellers

The left propeller remained attached to the engine. One blade remained straight and exhibited light chordwise scratches and paint burnishing on the cambered side. The other blade was bent aft around the cowling in the shank area. The blade remained straight, no twisting or curling, outboard of the bend at the shank and it also had minor paint burnishing.

The right propeller was separated from the right engine and came to rest under the fuselage embedded in the soft soil. One blade was straight and exhibited no rotational impact signatures. The other blade was bent aft around the cowling in the shank area. It also remained straight outboard of the bend and did not exhibit rotational impact signatures.

Research & Testing

A Shadin digital fuel flow indicator was removed from the instrument panel and retained by the NTSB-IIC for data analysis. The data analysis had not been completed at the time this report was written.

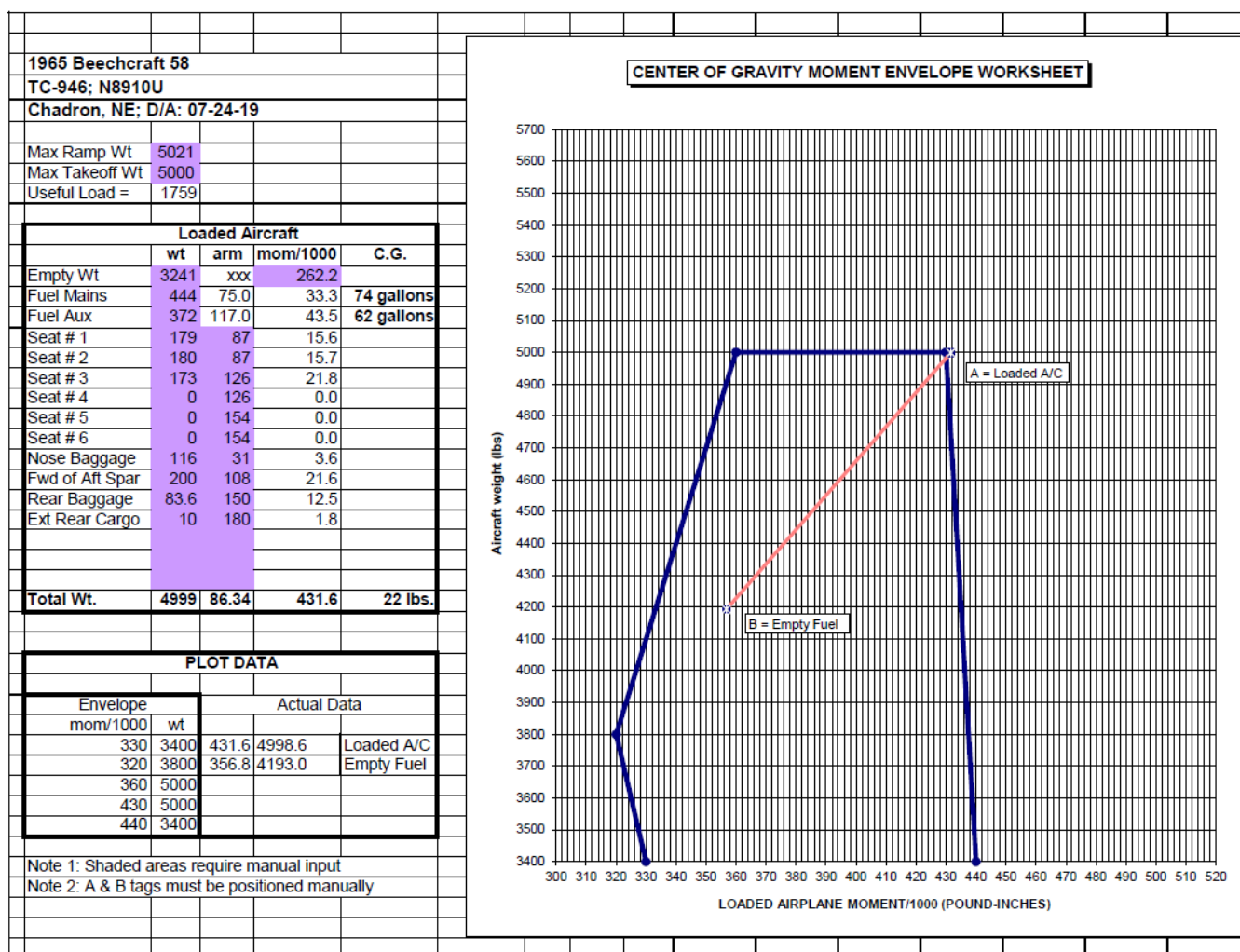


Shadin Fuel Flow Indicator

As noted earlier in this report, the aircraft had been packed with camping gear. The cargo was collected at the accident site and weighed. The cargo in the cabin weighed 293.6 pounds. The cargo in the nose baggage area weighed 116 pounds.

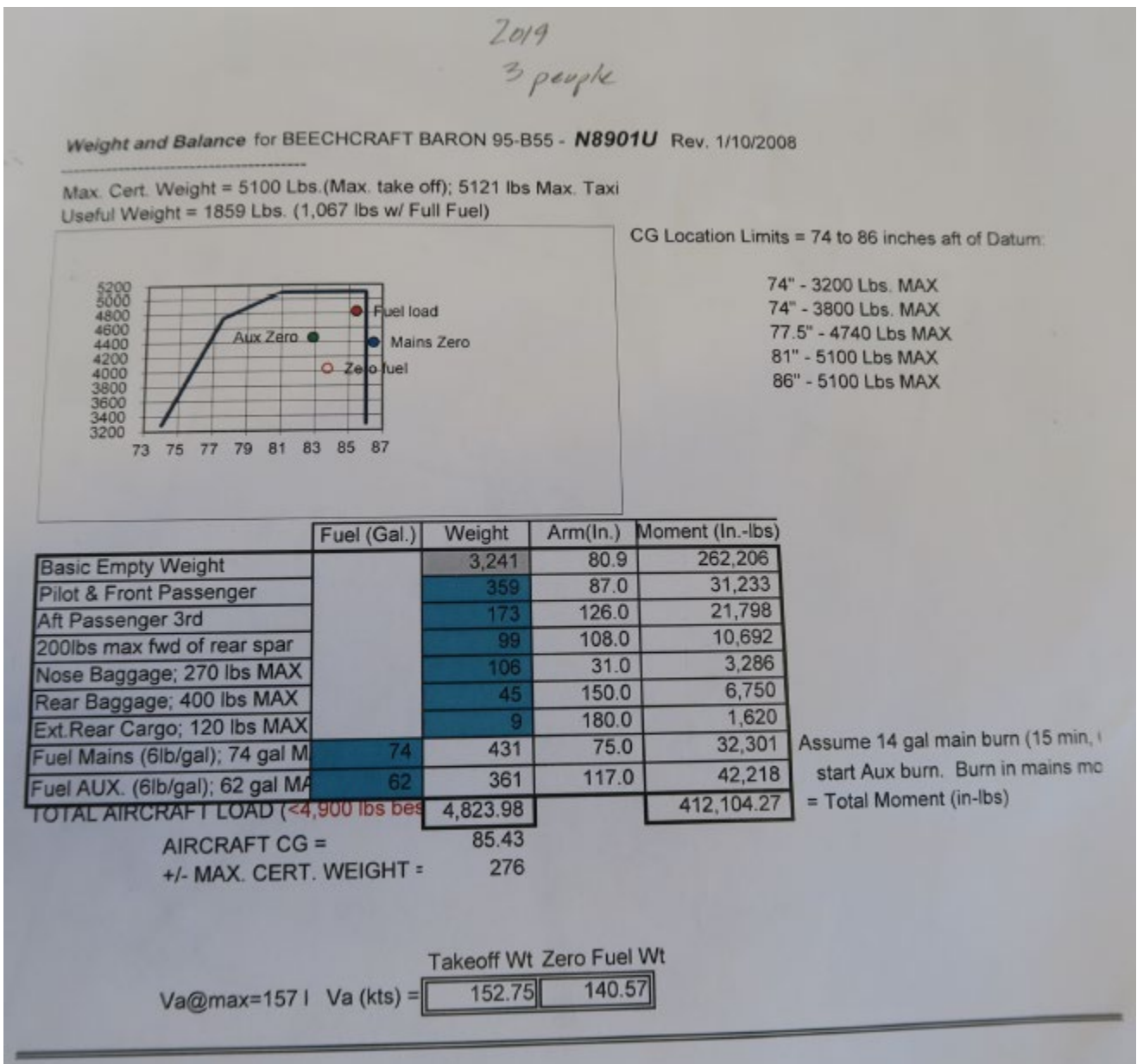
The pilot had completed a detailed list of cargo weights for individual items and had also calculated a weight and balance sheet for the flight to KOSH. The pilot included 10 pounds of cargo located in the extended rear cargo area at arm 180. Thus, the same locations were used when calculating the weight and balance and the maximum allowable weight of 200 pounds of cargo was placed forward of the aft wing spar at arm 108.

The aircraft weight and balance calculations showed the aircraft weighed 4,999 pounds at takeoff and the center of gravity moment was 431.6. That is one pound below the maximum takeoff weight and aft of the aft moment limit at takeoff. At the time of the accident, the fuel burn would have moved the CG forward into the envelope and the weight of the aircraft would have been approximately 4,200 pounds.



Calculated Weight and Balance

The pilot calculated weight and balance included a total of 259 pounds of cargo. A total of 409.6 pounds of cargo was weighed in the hangar.



Pilot Calculated Weight and Balance