

Air Safety Investigations Aircraft Incident/Accident Technical Report

Aircraft Incident/ Accident Information	Year: 1973	Make: Cessna	Model: 340
	Serial number: 340-0214		Registration: N247AT
Location: Bartow, FL		Date: 12-24-17	Time: 0715 EST
Aircraft Owner		Aircraft Operator	
Aviation Transportation, LLC [REDACTED]		John Hugh Shannon [REDACTED]	
Report Information			
Senior Air Safety Investigator: Andrew L. Hall		Report #: ASI-18-AB-T	Report date: 10-24-18

Airframe

Impact Sequence and Airframe Structure

The entire aircraft was significantly damage from the impact and post impact fire. The fuselage was viewed in three major sections the aft fuselage including the empennage up to the aft pressure bulkhead. The aft cabin area from the aft pressure bulkhead to the rear wing spar area and the forward cabin area from the main spar forward. The wings, from outboard of the left engine to outboard of the right engine, were observed in one section. Both tip tanks were separated from the wings.

Airframe Systems

Flight Control System Information		
Control lock: Undetermined		
Flight Control Cable Continuity		
Ailerons: Established	Elevators: Established	Rudder: Established
Aileron tab: Established	Elevator tab: Established	Rudder tab: Established
Flap and Trim Positions		
Flap indicator: Unknown	Flap handle: Unknown	Flap actuator: See below
Elevator trim:	Indicator: Unknown due to damage	Actuator: 2.25 Past limits tab up
Rudder trim:	Indicator: Unknown due to damage	Actuator: 1.9 Past limits tab right
Aileron trim:	Indicator: Unknown due to damage	Actuator: 2.0 At limit tab up

Remarks:

The aircraft had been recovered and control cables had been cut during recovery. All of the primary flight control cables were observed attached at both their input and output controls. The elevator trim cable had a tension overload separation near the actuator and the other cable was intact into the aft fuselage area. The trim tab actuator was pulled beyond the tab up limit. The aileron trim actuator was observed separated from the structure with the chain and cables attached. The rudder actuator was

observed in the place in the rudder. The flaps were observed in multiple positions and the flap motor was observed separated from the structure. Flap position could not be determined.

Airframe Fuel System Condition, Controls, and Read Outs					
Fuel strainer screen:		Left: Debris observed		Right: Debris observed	
Fuel strainer bowl:		Left: Light corrosion		Right: Light corrosion	
Main fuel tank gauge:		Left: Undetermined		Right: Undetermined	
Auxiliary fuel gauge:		Left: Undetermined		Right: Undetermined	
Locker fuel gauge:		Left: Undetermined		Right: Undetermined	
Locker transfer:		Left: Undetermined		Right: Undetermined	
Fuel selector handle:	Left: See below	Fuel selector valve:	Left: Off	Fuel boost pump:	Left: Undetermined
	Right: See below		Right: Off		Right: Undetermined

Remarks:

The fuel selector panel in the cockpit was observed separated from the structure. The right fuel selector handle was observed between the Auxiliary and crossfeed position. The left fuel selector handle was observed pulled past the crossfeed position. Both the left and right fuel selector valves were observed separated from the aircraft structure and in the off position. The fuel caps for the tip fuel tanks and one of the auxiliary tanks were observed installed in the filler neck. The other auxiliary fuel cap and filler neck were not observed. A fuel cap for a non-Cessna style tank was observed loose in the wreckage. The aircraft had non-Cessna wing locker fuel tanks installed by STC.

Landing Gear System Condition and Controls			
Gear position:	Nose: Retracted	Left: Retracted	Right: Retracted
Actuator position:	Nose: Retracted	Left: Retracted	Right: Retracted
Landing gear selector:	Undetermined		Aux gear control: See below
Environmental System Controls and Read Outs			
Cabin heater:	Undetermined	Cabin vent:	Undetermined
		Defrost:	Undetermined
Air conditioner:	Undetermined	Oxygen system:	Undetermined
		Oxygen quantity:	Undetermined
Pressurization System Controls and Read Outs			
Cabin pressurization:	Undetermined		Cabin VSI: Undetermined
Differential pressure:	Undetermined		Cabin altitude: Undetermined
Cabin altitude selector:	Undetermined		Ram air control: Undetermined
Left air control:	Undetermined		Source selector knob: Undetermined
Icing System Information and Switches			
Certified into known icing?	No		De-ice boots installed? Yes
Pitot heat:	Undetermined		Stall heat: Undetermined
De-ice:	Surface: Undetermined	Propeller: Undetermined	Windshield: Undetermined
Anti-ice:	Surface: Not applicable	Propeller: Undetermined	Windshield: Undetermined
ELT Information			
Installed? Yes	Manufacturer: See below	Model: Undt	Type: Undt
Serial number: Undt	Battery due date: Undt	Armed: Undetermined	Activated: No

Remarks:

The landing gear actuator was observed in the gear retracted position. Both the main landing gear were observed in the retracted position. The nose landing gear was observed in photographs approximately 250 feet from the main wreckage.

The ELT was observed in its bracket and was melted.

Cabin and Equipment/Furnishings

Restraint System Information						
Seat	Occupied	Restraint type	Restraint used	Condition	Manufacturer	
1	Yes	Undetermined	Undt	Burned	Undetermined	
2	Yes	Undetermined	Undt	Burned	Undetermined	
3	Yes	2-Point	Undt	Burned	Undetermined	
4	Yes	2-Point	Undt	Burned	Undetermined	
5	Yes	2-Point	Undt	Burned	Undetermined	
6	No	2-Point	Undt	Burned	Undetermined	

Seat Condition Information					
Seat	Orientation	Feet intact	Back intact	Base intact	Rail intact
1	Forward facing	No	No	No	No
2	Forward facing	No	No	No	No
3	Rear facing	No	No	Yes	No
4	Rear facing	No	No	No	No
5	Forward facing	Yes	Partially	Partially	Yes
6	Forward facing	Yes	Partially	Partially	Yes

Remarks:

One seat belt buckle was observed; it was in the latched position and was found near the cabin entry door. Seats #5 and #6 were observed attached to the seat tracks; all of the other seats were separated from the seat tracks.

Instrument Panel

Navigation Instruments							
Analog primary instruments				Autopilot type: King			
Suction gage: Undetermined		Magnetic compass: Undetermined		Clock: Undetermined			
	Left side	Right side		Left side	Right side		
Airspeed:	Undt	Undt	Turn coordinator (airplane):	Undt	Undt		
Attitude (pitch):	Undt	Undt	Turn coordinator (ball):	Undt	Undt		
Attitude (roll):	Undt	Undt	Heading indicator:	Undt	270		
Altimeter:	Undt	700'	Heading "bug":	Undt	Undt		
Altimeter setting:	Undt	29.99	Vertical speed indicator:	Undt	Undt		
Communication and Navigation Radios							
Radio	Control	Active frequency	Stand-by frequency	Radio	Control	Active frequency	Stand-by frequency
Com 1:	Undt	Undetermined	Undetermined	Com 2:	Undt	Undetermined	Undetermined
Nav 1:	Undt	Undetermined	Undetermined	Nav 2:	Undt	Undetermined	Undetermined
Obs 1:	Undetermined			Obs 2:	Undetermined		
Transponder:	Mode: Undetermined		Active code: Undetermined		Stand-by code: Undetermined		
Electrical Switch Positions							
Master battery: Undetermined							
Left alternator: Undetermined				Right alternator: Undetermined			
Avionics 1: Undetermined				Avionics 2: Undetermined			
Lighting Switch Positions							
Navigation: Undetermined		Rotating beacon: Undetermined		Landing: Undetermined			
Taxi: Undetermined		Strobe: Undetermined		Instrument: Undetermined			
Wing Ice: Undetermined							
Ignition Switch Positions							
Left engine:	Left magneto: Undetermined			Right magneto: Undetermined			
Right engine:	Left magneto: Undetermined			Right magneto: Undetermined			

Remarks:

Two attitude and one directional vacuum driven gyros were disassembled and inspected. All three gyros exhibited some signs of rotation. Also, an electric turn and bank indicator gyro was reviewed; it also exhibited signs of rotation. The Outside Air Temperature Gage read approximately 70 ° F.

Powerplant Description

Engine Instruments					
Hour meter: Undetermined					
	Left engine	Right engine		Left engine	Right engine
Tach RPM:	Undt	Undt	CHT:	Undt	Undt
Manifold press:	Undt	Undt	Fuel press:	Undt	Undt
Oil press:	Undt	Undt	Fuel flow:	Undt	Undt
Oil temp:	Undt	Undt	Ammeter:	Undt	Undt
EGT:	Undt	Undt	Voltmeter:	Undt	Undt
Left Engine Control Positions					
	Cockpit	Engine		Cockpit	Engine
Throttle:	Undetermined	Undetermined	Cowl flaps:	Open	Undetermined
Mixture:	Undetermined	Undetermined	Alt air:	Closed	Undetermined
Propeller:	Undetermined	Undetermined	Primer:	Undetermined	
Right Engine Control Positions					
	Cockpit	Engine		Cockpit	Engine
Throttle:	Undetermined	Undetermined	Cowl flaps:	Open	Undetermined
Mixture:	Undetermined	Undetermined	Alt air:	Closed	Undetermined
Propeller:	Undetermined	Undetermined	Primer:	Undetermined	
Engine Condition					
	Left engine		Right engine		
Engine attached to airframe:	No		No		
Propeller attached to engine:	No		No		
Engine compression:	See below		See below		
Vacuum pump drive shaft:	Intact		Undetermined		
Valve train continuity:	See below		Yes		
Engine Fuel System Condition					
	Left engine		Right engine		
Fuel pump drive shaft:	Intact		Seperated		
Fuel injectors:	Clean		Clean		
Fuel control inlet screen:	Clean		Clean		
Distribution valve screen:	Clean		Clean		

Engine Magneto Condition						
		Left engine			Right engine	
Left magneto attached:		Partially			No	
Left magneto spark:		All leads			All leads	
Right magneto attached:		Partially			Yes	
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	Normal	Normal	Normal	Normal	Normal	Normal
Bottom	Not examined	Not examined	Not examined	Not examined	Not examined	Not examined
Right Engine Spark Plug Condition (per Champion Check-A-Plug Card)						
	1	2	3	4	5	6
Top	Normal	Normal	Normal	Normal	Normal	Normal
Bottom	Not examined	Not examined	Not examined	Not examined	Not examined	Not examined

Remarks:

Both engines exhibited signs of impact and thermal damage. According to the CMI investigator no discrepancies were noted in either engine which would precluded normal operations. Both vacuum pumps were observed separated from the engines with significant impact damage. The right engine vacuum pump drive remained attached to the right engine and was observed melted. The left engine vacuum pump drive was separated from both the engine and the pump body. The drive was intact. A portion of the vacuum manifold was observed in the wreckage; however, it was only one of the end caps and no flapper valves were observed.

Propellers

Both propellers were observed separated from the engines. All three propeller blades remained in the hub on both propellers. The propeller spinners were observed displaced aft and one was separated from the propeller back plate. One of the propeller domes was observed displaced aft.

Research & Testing

Weight and balance per NTSB-IIC

The airplane maximum gross takeoff weight when delivered from Cessna was 5,975 lbs. An STC was accomplished which increased the maximum gross takeoff weight to 6,390 lbs and the calculated weight during the accident takeoff was about 6,495 lbs. Based on the calculated weight the airplane was 154.4 lbs over new maximum gross weight at the time of takeoff (figure 2) or 520 lbs over the Cessna gross weight. Due to the excessive weight, the airplane was outside of center of gravity moment envelope (figure 3).

Weight and Balance at Departure				
Loads		Weight (Pounds)	Arm (Inches)	Moment /1000
Empty Aircraft:		4453.3	151.2	673.4
Front Passengers:		400	137.0	54.8
Center Passengers:		300	175.0	52.5
Rear Passengers:		235	204.0	47.9
Forward Baggage:			77.0	
Aft Baggage:			242.0	
Locker Baggage:			184.0	
Main Fuel (Gal.)	84.0	504	150.3	75.8
Aux. Fuel (Gal.)	63.0	378	162.3	61.3
Locker Fuel (Gal.)	37.5	225	166.0	37.4
*Totals (6390 lb max):		6495		1003.1
CG = Total Moment / Total Weight:				154.4

Figure 2 – Calculated Weight and Balance

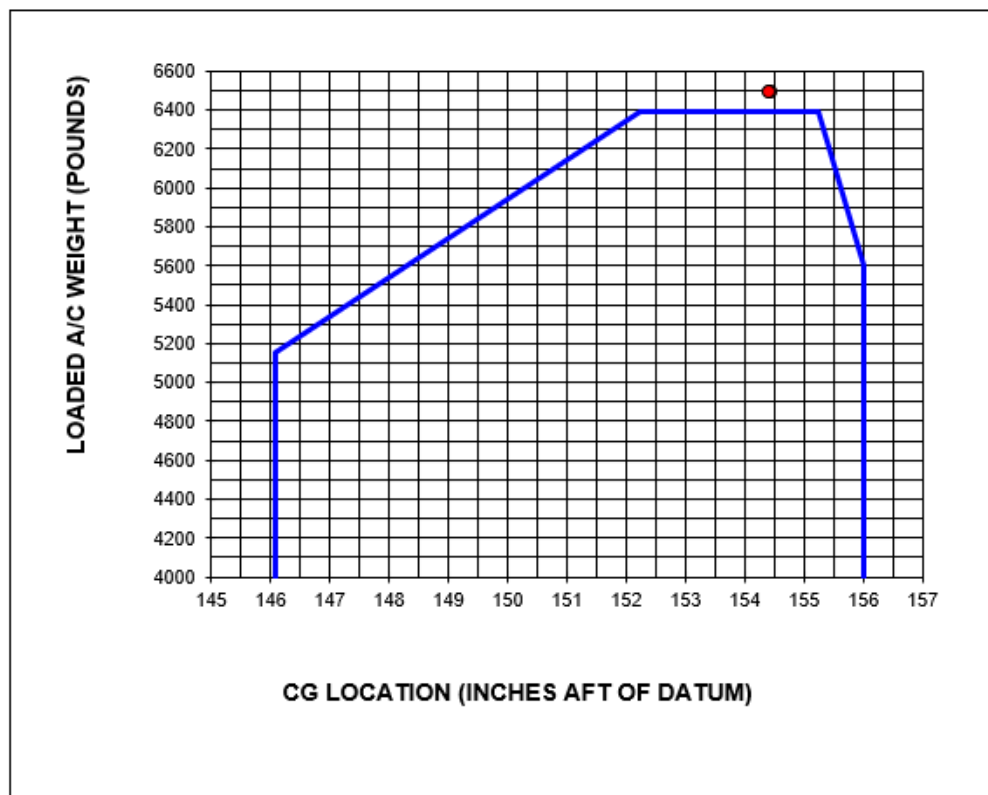


Figure 3 – Center of Gravity Moment Envelope