



## Survival Factors

### Airbag Safety Study Factual

July 14, 2009

**Location:** Groton, Connecticut  
**Aircraft Type:** Cessna 172  
**Accident Date:** November 19, 2008  
**Accident Time:** 1833 EST  
**Accident Number:** ERA09LA064  
**Airbag Equipped:**

#### Group Members:

*NTSB Group Chairman:*

Jana Price

*Additional Members:*

Paul Cox, NTSB (IIC)

Cynthia L. Keegan, NTSB

Tom Barth, Amsafe

Marilyn Pearson, FAA

#### Summary:

On November 19, 2008, at 1833 eastern standard time, a Cessna 172S, N2337F, was substantially damaged when it impacted trees during night flight instruction of practice landings Groton-New London Airport (GON), Groton, Connecticut. The certificated flight instructor and the student pilot incurred minor injuries. Visual meteorological conditions prevailed, and no flight plan had been filed for the flight, which originated at Westchester County Airport (HPN), White Plains, New York. The instructional flight was conducted under 14 Code of Federal Regulations Part 91.

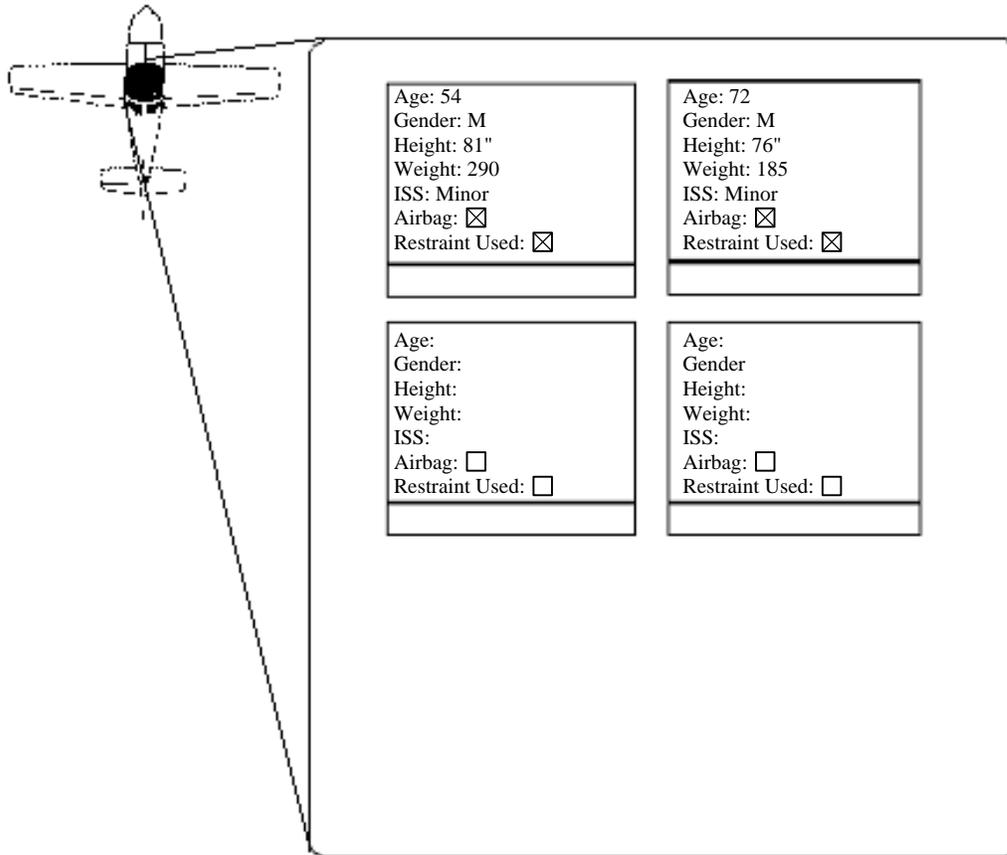
The student pilot, sitting in the left seat, reported that he was practicing full stop landings at Groton. About 1825, he took off from runway 33 for his third practice landing, and on final approach, he "suddenly lost sight of the runway and went into the trees."

The flight instructor stated that while on the final approach to runway 33, he looked at the airspeed indicator, and when he looked back up, all he saw were trees. The flight instructor further noted that it appeared that the airplane was "lined up properly and centered on the runway."

A Federal Aviation Administration (FAA) inspector documented the accident scene. According to the inspector, the airplane impacted 30 to 40-foot trees, about 1/4 mile from

the runway. The trees were located in a hilly, heavily wooded area at an elevation of about 200 feet msl. Tree damage extended for about 100 feet and was generally aligned toward runway 33.

**Seating Chart:**



**Aircraft Damage:**

The airplane impacted the ground at the forward left side of the engine and came to rest nose down with its left wing tip crushed from impact with the ground (figure 1). The nose gear collapsed and the engine partially separated from its mounts. The glare shield was scratched across the upper window pane. The tail of the empennage was bent to the right at the middle of the registration number. The right cabin door was compressed inboard about 1 inch and the door was jammed in the closed position. The left cabin door separated from the airplane and its hinges were sheared where the door mounted to the upper and lower hinges.<sup>1</sup>

<sup>1</sup> See page 9, Interview/Medical Information for interview statements regarding damage to the left cabin door.



**Figure 1: The final rest position of the accident aircraft**

The upper trim control on the left side control column was fractured exposing the trim electrical wires (figure 2). The throttle lever was bent inboard towards the mixture control and the adjacent mixture lever was bent inboard towards the throttle lever resulting in a .10 inch gap between the throttle and mixture levers (figure 3). Additionally, the "wing flaps" lever on the right side of the cockpit was bent downward (figure 4) and the parking brake bracket was fractured and bent rearward. The fuel shutoff was in the "off" position. The fuse panel on the right lower side of the instrument panel was compressed forward and fractured at the outboard and center console. The outboard side of the instrument panel was compressed 4 inches forward toward the firewall and the inboard side next to the center console was compressed 3 inches forward. The panel containing: Master/Avionics, and Battery/Dimming/Lights switches on the left side of the instrument panel was displaced outboard about .10 inch and cracked in the middle of the panel. The Hobbs meter registered 899.2 hours.

The rear seat window on the right side of the cabin was cracked and the left rear seat window was intact. The aft cabin window was also intact. The cabin headliner was compressed inboard above the passenger seats adjacent to the aft wing spar.



Figure 2: The upper trim control on the left side control column.



Figure 3: The throttle and mixture levers.



**Figure 4: The wing flaps lever on the right side of the instrument panel.**

### **Seats:**

The dimensions of the seats are documented in figure 5. Because the cabin seats are manufactured by Cessna and type certificated with the airplane, there is no unique part number or serial number for the seats. The cockpit seat and rear cabin seats were intact and no damage was observed to the seat covering or the seat frames. The left seat was adjusted to the 11<sup>th</sup> pin back from full forward and the right seat was adjusted to the 9<sup>th</sup> pin back from full forward. The cockpit seats were removed and no deformation of the seats was observed.

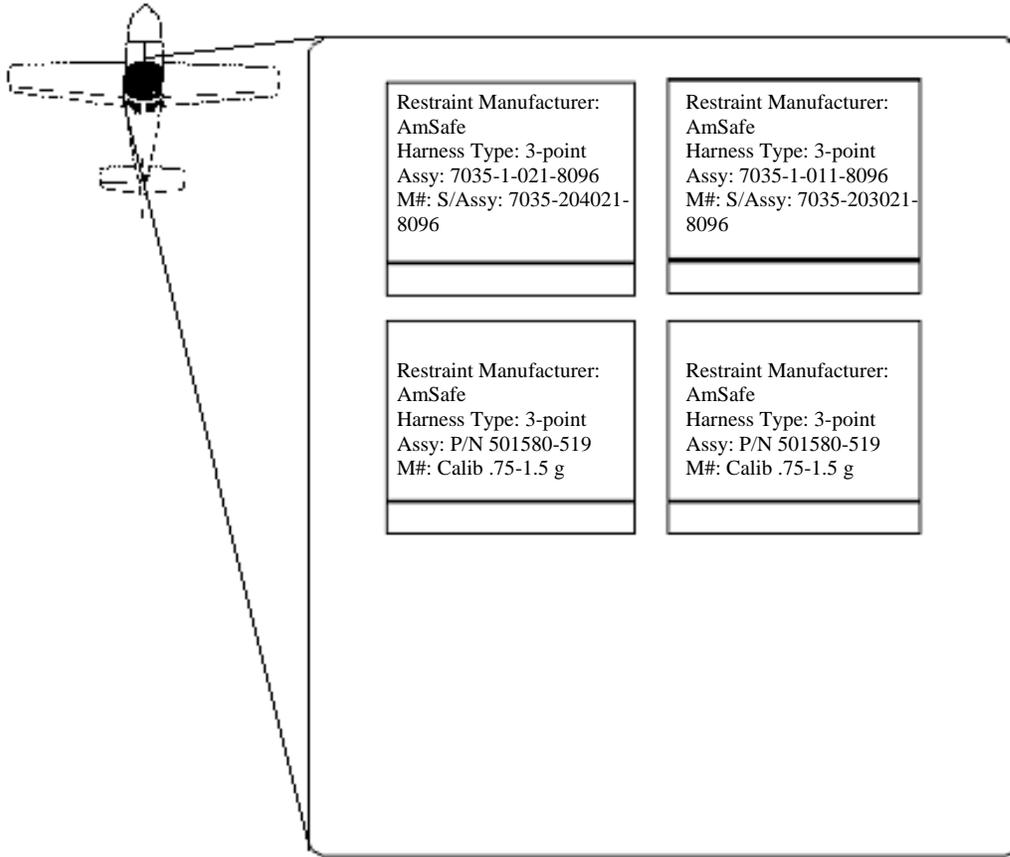


**Figure 5:** Dimensions of the seats.

**Restraints:**

The three point AmSafe restraints were intact and the webbing showed no evidence of trauma. The webbing on each shoulder restraint showed a thin area of stress where the load bar for the connector tongue had been positioned for the left and right cockpit seat. The left shoulder restraint showed that the witness mark (load bar location during impact) was positioned 19.5 inches away from the edge of the airbag cover. For the right seat, the distance between the edge of the cover to the load bar mark was 12.25 inches.

**Restraint Numbers:**

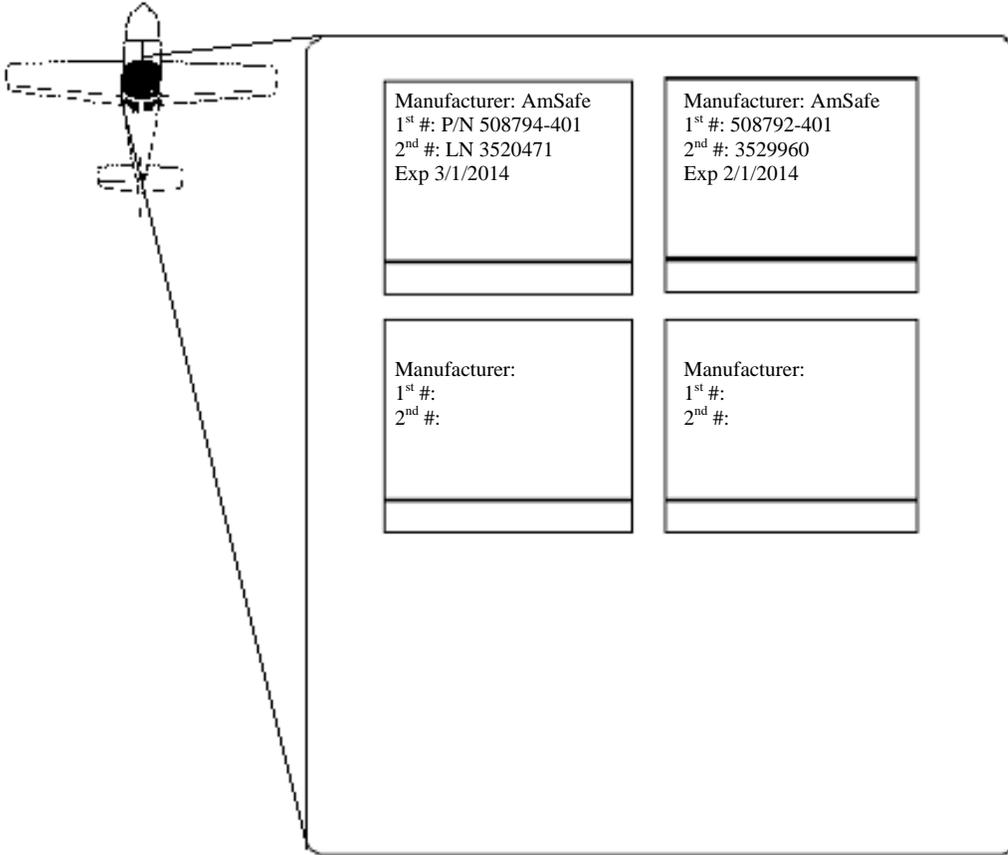


**Airbags:**

Both airbags were deployed and the airbag stitching and seams were intact and no damage was observed. The latch sensors (buckle switches) for both airbags were intact and the vent holes for both airbags were round and intact.

On the left airbag, there were some small black scuff marks on the occupants side approximately 14 inches from the top of the bag to 19 inches from the top of the bag and 3 inches from the inboard edge of the bag. On the right airbag, there were black scuff marks on the instrument panel side of the bag at the base extending approximately 5.5 inches from the bottom.

**Airbag Inflator Assemblies:**



A diagram of an airplane is shown on the left, with a callout line pointing to a large rectangular box on the right. This box contains four smaller rectangular boxes arranged in a 2x2 grid, each intended for recording information about an airbag inflator assembly.

Manufacturer: AmSafe 1 <sup>st</sup> #: P/N 508794-401 2 <sup>nd</sup> #: LN 3520471 Exp 3/1/2014	Manufacturer: AmSafe 1 <sup>st</sup> #: 508792-401 2 <sup>nd</sup> #: 3529960 Exp 2/1/2014
Manufacturer: 1 <sup>st</sup> #: 2 <sup>nd</sup> #:	Manufacturer: 1 <sup>st</sup> #: 2 <sup>nd</sup> #:

**Interview/Medical Information:**

Interviews were conducted with both the left (student) and right (instructor) seat pilots. The student pilot reported that after the accident, they could not get the doors open and fuel was leaking into the cabin. He said he turned in his seat and pushed his door with his feet and the door opened, and he and the instructor pilot exited out the left door. Mountain bikers in the vicinity guided them to an area where an ambulance was waiting. He said that the ambulance personnel removed their fuel soaked clothing, washed them with saline, and gave them blankets. They were taken to Laurence Memorial Hospital in New London, Connecticut. The hospital staff checked their vitals, respiration, heartbeat, and reflexes. Both occupants were x-rayed and no broken bones were observed. They were released from the hospital the same evening. The left seat pilot stated that his injuries included a chip out of his thumbnail, a bruised right knee, and sore ribs where his shoulder harness restrained him during the crash.

The right side pilot reported that his chest hurt where his airbag restrained him during the crash. He previously had a “bad back” and he felt back pain and sustained a minor laceration on his knee, and a couple of bruises on his knuckles on both hands.

<b>Occupant Location</b>	<b>Gender</b>	<b>Age</b>	<b>Height</b>	<b>Weight</b>	<b>Description Of Injuries</b>	<b>Injury Classification</b>
1 <sup>st</sup> Row, Left	M	54	81"	290	Thumb and right knee	Minor
1 <sup>st</sup> Row, Right	M	72	76"	185	Bruised knuckles	Minor
2 <sup>nd</sup> Row, Left						
2 <sup>nd</sup> Row, Right						