

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: July 24, 1978

Forwarded to:

Honorable Langhorne M. Bond
Administrator
Federal Aviation Administration
Washington, D. C. 20591

SAFETY RECOMMENDATION(S)

A-78-47 and -48

On November 17, 1977, N3837C, an Aero Commander 560E, crashed on a farm after the pilot initiated an emergency descent near Queen, Pennsylvania. The pilot, who was injured seriously in the crash, died shortly after he was released from a hospital.

The pilot reported that while flying at 9,500 feet between cloud layers he noticed a drop in manifold pressure and experienced engine roughness accompanied by a loss of power in both engines. Although he applied alternate air to both engines, he was not able to regain normal engine operation.

Investigation revealed that both engines were capable of developing full power and that there was sufficient uncontaminated fuel in the fuel tanks to power the engines.

On November 26, 1975, in a similar accident, N699E, an Aero Commander 560E, crashed about a mile from the Quad City Airport, Moline, Illinois. The pilot was killed in the crash.

The National Transportation Safety Board's investigation of the accident disclosed that the pilot had been flying at 11,000 feet on an instrument flight rules (IFR) flight plan when he reported to air traffic control that he could no longer obtain sufficient power from his engines to maintain his assigned altitude. The airplane was being vectored to the Quad City Airport when it crashed in a residential area. Persons who arrived first at the crash site noted that the ram air tubes and mixing chambers of both carburetors were packed with ice.

The Aero Commander 560E uses Stromberg PS Series, Model 5BD carburetors. This is an injection-type, single-barrel, low-pressure carburetor. Fuel is introduced downstream from the throttle valve and beyond the venturi chamber. This design feature virtually eliminates fuel vapor ice and reduces the hazard of throttle ice in the induction system.

A third type of induction ice--impact ice--does pose a problem for aircraft which use injection-type pressure carburetors. When these aircraft are flown for extended periods in weather conditions conducive to the formation of ice on leading edges of the aircraft structure, impact ice may form in the carburetor air inlet ducts, the carburetor screen, the carburetor elbow, the heat valve, and the carburetor metering elements.

Because of the generally favorable design and performance characteristics of the injection-type pressure carburetor, pilots of airplanes such as the Aero Commander 560E may not recognize that impact ice poses a potential hazard for their aircraft. Moreover, undue delay in switching to the alternate air system in some icing conditions may result in an ice accumulation which immobilizes the heat valves. Once this has happened, the pilot may be powerless to counter further ice buildup, and he may subsequently lose all power.

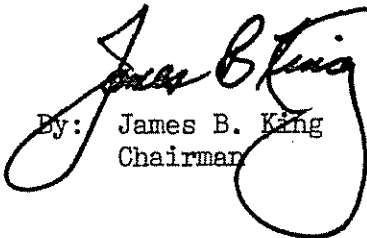
The flight operations manual for the Aero Commander 560E gives the pilot no guidance as to when the alternate air system should be used. The pilot must rely on other sources to obtain this information. One such source is Advisory Circular 60-9, Induction Icing - Pilot Precaution and Procedures, dated February 28, 1973. The AOPA Air Safety Foundation Flight Instructors Safety Report is another informative publication. We believe, however, that additional measures should be undertaken to disseminate this information more widely among the users.

Accordingly, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Direct accident prevention specialists, flight instructors, and flight examiners, as part of their training or biennial review programs, to inform all owners and pilots of aircraft which use injection-type, pressure carburetors of the aircrafts' susceptibility to impact ice in the induction system. (Class II -- Priority Action) (A-78-47)

Require manufacturers of aircraft equipped with the subject carburetors to publish and provide to all owners the necessary information about this hazard and how to cope with it in flight. (Class II -- Priority Action) (A-78-48)

KING, Chairman, McADAMS, HOGUE, and DRIVER, Members, concurred in the above recommendations.


By: James B. King
Chairman