

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: October 12, 1983

Forwarded to:

Honorable J. Lynn Helms
Administrator
Federal Aviation Administration
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-83-67 through -69

On December 18, 1982, a Cessna Model 182, N92612, ditched in the Wanaque Reservoir at Ringwood, New Jersey, following a loss of engine power. The pilot, the only occupant aboard, was killed. The National Transportation Safety Board's investigation disclosed that the loss of power resulted from pieces of a deteriorated carburetor air filter obstructing and being ingested into the air induction system.

The dry paper air filter, manufactured by the Donaldson Company in June 1972 and first installed in N92612 about 10 years before the accident, had been in service for approximately the last 1,100 hours of engine operation. The bottom and side portions of the filter's aft retaining screen had separated from the frame assembly, thus permitting pieces of the deteriorated paper filter element to enter the carburetor air induction system and block the carburetor venturi section. Also, pieces of paper were found between an intake valve and valve seat, between spark plug electrodes, and in the engine oil sump.

The filter assembly in N92612 should have been routinely replaced some time before the accident since fraying, shredding, tearing, or detachment (from the screens) of the filter's paper pleats would have been inevitable and obvious during such an extended period of service. Although this type of filter may be cleaned with compressed air or by washing, maintenance personnel should be aware of the limitations of cleaning and reusage, particularly after the filter has been in service for some time. Cessna recommends, as stated in the C-182 service manual, that the filter be replaced after 500 hours of engine operation or 1 year, whichever occurs first, or whenever damage or deterioration is evident. Actual replacement schedules, however, vary widely. In contrast, Airworthiness Directive 80-08-14, applicable to carburetor air inlet filters manufactured by Pure-Air Incorporated, requires that the foam filter elements be replaced every 100 hours of engine operation or 12 calendar months, whichever comes first, or any time 50 percent of the filter element is covered with any foreign material.

A Safety Board survey of service difficulty reports for the period January 1978, through May 1983, filed at the Federal Aviation Administration's (FAA) Maintenance Analysis Center indicated that carburetor air filter deterioration, disintegration, and ingestion of pieces of the filter element into the engine occurs frequently. Remarks in the reports included: "back screen of intake air filter came loose—paper element partially disintegrated;" "engine ran rough due to air intake filter coming apart—pieces lodged in venturi;" "paper air inlet filter breaking apart—no record of replacement;" "pilot noted significant loss of power—found engine intake air filter had separated and partially blocked the carburetor vent;" and "the filter element shredded and fell through wire mesh."

Additionally, several engine failure/malfunction incidents which occurred during this same period clearly involved pieces of the air filter elements being ingested into the carburetor air induction system. FAA reports pertaining to these incidents contain remarks such as: "lost power, tried for sandbar, crashed in river avoiding wires, found parts of carburetor air filter in venturi and valves;" "engine quit on takeoff climb, crashlanded off airport, induction air filter deteriorated, blocked air inlet;" "engine lost power, pilot landed in cane field, found portions of the air filter lodged in the carburetor venturi;" and "engine quit over lake, ditched in water offshore, air intake foam rubber became dried, shredded, fouled intake."

The Safety Board believes that the FAA should emphasize the maintenance, operational, and inspection considerations relating to these and other carburetor air induction system filters in Advisory Circular 43-16, General Aviation Airworthiness Alerts. Moreover, an Airworthiness Directive should be issued requiring mandatory replacement of Donaldson dry paper air filters at appropriate intervals. The Safety Board believes, also, that an engineering evaluation should be conducted of other types of general aviation air filters to determine whether similar mandatory replacement intervals should be established.

Therefore, in order to prevent a recurrence of the above type of accident, the Safety Board recommends that the Federal Aviation Administration:

Issue an Airworthiness Directive applicable to all airplanes equipped with Donaldson dry paper carburetor air filters, requiring mandatory replacement of such filters at appropriate time or service intervals. (Class II, Priority Action) (A-83-67)

Conduct an engineering evaluation of all general aviation carburetor air filter designs to determine whether mandatory replacement time or service intervals should be established. (Class II, Priority Action) (A-83-68)

Emphasize on a recurrent basis in Advisory Circular 43-16, General Aviation Airworthiness Alerts, maintenance, operational, and inspection considerations relating to carburetor air induction system filters. (Class II, Priority Action) (A-83-69)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and McADAMS, BURSLEY, and ENGEN, Members, concurred in these recommendations.


By: Jim Burnett
Chairman