

NATIONAL TRANSPORTATION SAFETY BOARD WASHINGTON, D.C.

ISSUED: May 8, 1981

Forwarded to:

Honorable J. Lynn Helms
Administrator
Federal Aviation Administration
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)
A-81-54 through -56

The Flight Standards National Field Office, AFO-500, Service Difficulty Automatic Data Processing System Bank has provided statistical information which indicates that there is an upward trend in Service Difficulty Reports concerning the Brackett engine air inlet systems.

In October 1980, engine air inlet system problems in the Cessna 177 alerted the Federal Aviation Administration's Service Difficulty Automatic Data Processing System. During the 2-year period from September 1, 1978, through September 18, 1980, there were 20 reports of such problems. An upward trend in the rate of reporting was noted when nine reports were processed between April 16 and September 5, 1980. Of the nine reports one report cited a defective aluminum retainer screen, and five reports stated that the engine air filter gaskets failed, separated, and lodged in the carburetor/injector air passages which reduced air flow and available engine power. These failures resulted in two accidents and three unscheduled landings. Both accidents and the two unscheduled landings occurred on aircraft equipped with the Brackett air filter.

A search of FAA Service Difficulty Reports conducted in January 1981 indicated that 16 incidents of Brackett air filter system failure were reported between May 3, 1979, and December 5, 1980. These incidents involved four Cessna 177's as well as Beech, Piper, and other Cessna aircraft. Five reports cited failures of the gasket assembly, 10 reports cited failures of the screen assembly, and one report cited a loose seal.

A survey of NTSB briefs of accidents from 1965 through 1979 revealed 14 accidents in which foreign material affected normal operation of the carburetor/injector system. Cessna aircraft were involved in 7 of the 14 accidents.

The Brackett Aircraft Company, Inc., formally Brackett Aircraft Specialties, is a source supplier and holder of an FAA type certificate for its engine air filter assemblies. On December 29, 1977, the FAA issued Supplemental Type Certificate (STC) No. SA71GL for a design change for the company's engine air filter assemblies. The STC affected Cessna models 177, 180, 210, and 310 aircraft, Grumman American model AA-1 aircrafts and Piper PA-20 aircraft. The company also issued two Service Bulletins, Nos. 1 and 2, both of which stated that the aluminum retainer screen should be replaced with a steel screen for the aircraft mentioned in the STC. However, both bulletins excluded the Cessna 177 model aircraft.

As a result of the reports of the defective aluminum retainer screen in the air filter assembly, the FAA issued Airworthiness Directive (AD) 78-25-05, effective December 15, 1978. The AD established an inspection requirement of the aluminum retainer screens for failed areas and required replacement of the aluminum retainer screen with a steel screen if failed areas were noted during the inspection. The AD modification was in accordance with STC SA71GL. The AD applied to numerous Cessna aircraft models but did not include the Cessna 177 model.

After AD 78-25-05 became effective, the Brackett Aircraft Company, Inc., issued Service Bulletin No. 3, which superseded Service Bulletin No. 2 and also stated that the aluminum retainer screen should be replaced with a steel screen. Service Bulletin No. 3 also applied to various aircraft models, including some Cessna aircraft; however, the Cessna model 177 aircraft again was excluded. On July 15, 1980, Brackett issued Service Bulletin No. 4 which applied to the Cessna 177, or any aircraft equipped with the Brackett air filter assembly, and required that the aluminum retainer screen be replaced with a steel screen.

The Brackett Aircraft Company, Inc., aware of the filter gasket defects in their engine air filter assemblies, on July 28, 1980, issued Service Bulletin No. 5, which stated that the gaskets had become loose because of the effects of oils, grease, fuel, and loose and improper fitting fasteners that held the filter in place. The company recommended that gasket retainer strips be installed to prevent the gasket from entering the engine induction system in the event the gasket should become loose. Service Bulletin No. 5 included the model number of the air filter used on the Cessna 177 aircraft. The company also has made kits available to upgrade existing filters.

The Brackett Aircraft Company, Inc., informed the Safety Board that its gasket retainer strip will provide a tight fitting filter frame. A tightly fitted filter will squeeze the gasket, prevent deterioration, and prevent greases and solvents from penetrating the bond. A loose fitting filter will cause the gasket to vibrate and allow grease and solvent to penetrate the bond. The president of the Brackett Aircraft Company, Inc., stated that the Cessna 177 aircraft is vulnerable to filter frame vibration.

The Brackett Aircraft Company has advised the Safety Board that they could not supply a sudden request for a large number of kits to upgrade existing installed filters. Both the Brackett Aircraft Company Service Bulletin No. 3 and AD 78-25-05, Brackett Aircraft Specialities, Inc., note that an inspection of the screen gasket assembly should be performed within 25 hours of receipt of the Service Bulletin or Airworthiness Directive. Additional inspections were to be made at 100-hour intervals until the screen assembly was replaced. The airworthiness directive required that the aluminum screen gasket assembly be replaced with a steel assembly within 525 hours after receipt of the AD. The Safety Board believes that AD 78-25-05 should apply to the Cessna 177.

The Safety Board contacted the Cessna Aircraft Company for information on the use of Brackett air filter assemblies on its aircraft. Its designated engineering representative, who also was project engineer on the Cessna 177, stated that the Brackett Company never was a supplier of engine air inlet system for their company and was not an approved vendor for Cessna. However, owners/operators can and do purchase and install Brackett air filters on their aircraft. Even though the Cessna 177 has not been manufactured since 1978, the FAA Registry Section reported that there are 3,166 registered Cessna 177's in the United States.

The Safety Board became aware on February 13, 1981, that the FAA Western Region Aircraft Modification Section, Engineering and Manufacturing Branch (AWE-211), is conducting a special study on the Brackett engine air inlet system. The Safety Board also has been informed that the FAA is considering airworthiness action on this subject.

Because of the upward trend in Brackett air filter defect reports since the issuance of AD 78-25-06 and the two Brackett Aircraft Company, Inc., Service Bulletins, the Safety Board believes that additional corrective measures should be taken to prevent further accidents resulting from air filter failures.

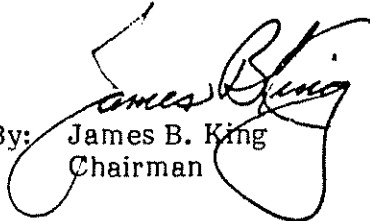
Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Revise Airworthiness Directive 78-25-05, Brackett Specialties Company, to include all aircraft listed in Brackett Aircraft Company, Inc., Service Bulletin Nos. 3 and 4. (Class II, Priority Action) (A-81-54)

Issue an Airworthiness Directive which would require compliance with Brackett Aircraft Company, Inc., Service Bulletin No. 5, dated July 28, 1980. (Class II, Priority Action) (A-81-55)

Issue a General Aviation Airworthiness Alert to inform all users of Brackett Aircraft Company, Inc., air filter assemblies of the requirements of AD 78-25-05, Brackett Specialties Company, as amended, and of the need to comply with Brackett Aircraft Company, Inc., Service Bulletin Nos. 3, 4, and 5. (Class II, Priority Action) (A-81-56)

KING, Chairman, DRIVER, Vice Chairman, McADAMS and GOLDMAN, Members, concurred in these recommendations. BURSLEY, Member, did not participate.

By: 
James B. King
Chairman