

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

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Forwarded to:

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SAFETY RECOMMENDATION(S)

A-82-140 and -141

The National Transportation Safety Board has investigated three recent accidents involving Piper PA-31-350 airplanes which required aviation gasoline (AVGAS) but which had been inadvertently serviced with jet fuel. One accident occurred on April 18, 1981, in Houston, Texas; the second occurred on April 18, 1982, in San Antonio, Texas; and the third occurred on May 22, 1982, at Midland, Texas. All three accidents occurred shortly after takeoff, and the airplanes crashed in densely populated areas.

In 1970, as a result of a Martin 404 accident in Atlanta, Georgia, in which the airplane had been inadvertently refueled with jet fuel rather than AVGAS, the Safety Board forwarded the following three recommendations to the Federal Aviation Administration (FAA):

Amend Parts 23, 25, 27, and 29 of the Federal Aviation Regulations to require the appropriately colored circle around each filler opening in addition to the presently required minimum fuel grade markings on each aircraft. The colored circle should correspond to the fuel color and should be placed on a slightly larger white circle to assure ease of differentiation between the color of the aircraft and the color of the fuel circle.

Require painting of existing aircraft within a year after the date of publication of the amendments to Parts 23, 25, 27, and 29.

Add another paragraph to the "Markings" section of Advisory Circular 20-43a suggesting that refueling nozzles be marked with the prescribed color code.

In response to these recommendations, the FAA revised Advisory Circular 20-43a to Advisory Circular 20-43b and in May 1975, issued the following Notice of Proposed Rulemaking (NPRM):

3618-A

The Federal Aviation Administration is considering amending Parts 23, 25, 27, 29, and 91 of the Federal Aviation Regulations to require a color-coding system for aircraft fuel filler openings, and to prohibit any person from operating an aircraft unless he has determined that the aircraft has been fueled through a fuel nozzle that is color-coded in accordance with the coding system used on the exterior surface of the aircraft around each filler opening and that matches the color around the opening; or it has been determined in some other manner that the aircraft has been fueled with the proper type of fuel.

The NPRM was withdrawn later in 1975 due to the more than 400 adverse comments received. Among those who opposed the amendments were the Aircraft Owners and Pilots Association on behalf of its approximately 180,000 members, the National Pilots Association, the Experimental Aircraft Association, the National Business Aircraft Association, the Helicopter Association of America, numerous manufacturers of general aviation airplanes and helicopters, fixed-base operators, and a great many individual and business owners of general aviation aircraft. The Air Transport Association of America (ATA) objected on behalf of ATA member airlines for numerous reasons including the fact that operators under Parts 121, 127, and 135 are already required to have competent personnel, facilities, equipment, and procedures for fueling, thereby greatly reducing the possibility of a mistake in fueling. Others stated that the color coding system would spoil the appearance of their aircraft paint scheme, would be expensive to apply initially, and would be a continuing expense to maintain.

Since the Safety Board's recommendations in 1970, there have been 13 accidents which are known to have been caused by the inadvertent refueling of aircraft with jet fuel when AVGAS was required. These accidents resulted in 11 fatalities, 9 serious injuries, 7 damaged aircraft, and 6 destroyed aircraft. Numerous other aircraft have been inadvertently refueled with jet fuel when AVGAS was required, but the mistakes were detected in time to prevent accidents from occurring.

As a result of the three referenced accidents, the Safety Board staff has contacted the following organizations to determine their current views regarding a solution to the problem:

1. National Business Aircraft Association
2. General Aviation Manufacturers Association
3. Aircraft Owners and Pilots Association, Air Safety Foundation
4. Cessna Aircraft Company
5. Piper Aircraft Corporation
6. Beech Aircraft Corporation
7. Gulfstream American Corporation
8. Bell Helicopter
9. Teledyne Continental
10. Avco-Lycoming
11. Exxon Company USA
12. Shell Oil Company
13. Chevron USA
14. Phillips Petroleum Company
15. Mobil Oil Company
16. Texaco
17. National Air Transportation Association

18. Organization of Flying Adjusters, Inc.
19. Associated Aviation Underwriters
20. United States Aviation Underwriters
21. Numerous other aviation insurance companies
22. American Association of Airport Executives

All of these organizations have agreed that action could be taken to prevent this type of accident from occurring, and all have agreed that a systems approach is needed to prevent misfueling.

One possible solution which has been discussed with these organizations would involve the standardization of nozzle and tank opening sizes so that nozzles delivering jet fuel could not be inserted into tanks that are intended for AVGAS. Such a system has been implemented successfully in the automobile industry to prevent the delivery of leaded fuel to automobiles equipped with catalytic converters.

To assure that such a system would be totally effective in aviation, it would be necessary to modify nozzles and tank openings used throughout the entire fuel distribution system, from refinery to airplane, so that jet fuel nozzles would not fit into AVGAS storage tanks, AVGAS tanker trucks, or AVGAS airplane tanks.

The implementation of such a system would require a cooperative and coordinated effort among all participants in the aviation fuel industry. Those organizations contacted by Safety Board personnel, some of which opposed the FAA's proposed action in 1975, have indicated that they would now support the development of such a system. The Safety Board believes that actions will be taken only if some segment of industry takes the initiative to exercise the leadership coordination role.

The Safety Board is aware of the General Aviation Manufacturers Association's (GAMA) interest in preventing airplane engine damage and accidents caused by inadvertent use of jet fuel in general aviation airplanes. The Safety Board commends GAMA's leadership in the recent development of color coding decals and tape for nozzle and tank opening identification as an interim measure. This system does not preclude the pursuit of more positive measures as described above, and by reason of GAMA's positive earlier efforts, the Safety Board believes that GAMA is the most appropriate organization to coordinate the efforts among the necessary participants to determine whether a total system is in fact practical and to define and oversee the actions required for its implementation.


The Safety Board has discussed this subject with appropriate FAA personnel who have indicated a willingness to attend an industry meeting to consider and organize the program. The Safety Board also will be available to attend such a meeting and assist where possible.

Therefore, the National Transportation Safety Board recommends that the General Aviation Manufacturers Association:

Convene a meeting of representatives of the aviation and petroleum industries to examine the practicality of standardizing and modifying nozzles and tank openings throughout the aviation fuel distribution system from the refinery to the airplane so that jet fuel cannot be inadvertently delivered to tanks intended for the containment of aviation gasoline (AVGAS). (Class III, Longer Term Action) (A-82-140)

Coordinate the action by the aviation fuel distribution industry to implement measures in the distribution system that will positively prevent the inadvertent fueling of reciprocating engine-powered aircraft with jet fuel. (Class III, Longer Term Action) (A-82-141)

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

  
By: Jim Burnett  
Chairman