

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

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Forwarded to:

Honorable Donald D. Engen
Administrator
Federal Aviation Administration
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-85-11 through -14

Since 1982, the Federal Aviation Administration (FAA) has regulated the operation of ultralight vehicles under 14 CFR Part 103. Increasing numbers of reports of ultralights being operated in regulated airspace and for nonrecreational purposes made it apparent to the Safety Board that an evaluation of the effectiveness of the FAA's regulatory approach to ultralights was needed. In the absence of a systematic accident data collection process on which to base the analysis, the Safety Board in March 1983 decided to investigate all fatal accidents involving a powered ultralight and other selected powered ultralight accidents involving obvious safety issues. Between March 1983 and September 1984, the Safety Board investigated 177 ultralight accidents, of which 88 involved a total of 93 fatalities. The Safety Board has prepared a report which describes the safety problems identified through analyses of these accidents, explores safety concerns raised by organizations and associations interested in ultralights, and recommends improvements in existing ultralight safety measures, where appropriate. 1/

The study found that operator lack of experience in flying the specific make and model ultralight vehicle is common to many of the accidents involving loss of control. In several instances, although the operators had significant amounts of flying time in conventional aircraft or other ultralight vehicles, they had little or no experience in the accident ultralight.

1/ For more detailed information, read Safety Study--"Ultralight Vehicle Accidents" (NTSB/SS-85/01).

In some accidents, loss of vehicle control was followed by a collision with the ground before a recovery could be made. In other accidents, a structural failure of the ultralight followed the loss of control because the vehicle exceeded its design speed or maneuvering limitations. In yet others, the operator exceeded the design speed limitations of the vehicle, resulting in a change of control characteristics due to aerodynamic loading increasing susceptibility to operator-induced oscillation and subsequent loss of control.

A comparison of underlying factors for ultralights and selected general aviation airplane fatal accidents 2/ revealed that:

- ° The ultralight fatal accidents involving airframe failures were often related to: improper assembly or maintenance of the vehicle, structural overload induced by the operator, or design or material defect.
- ° The general aviation airplane fatal accidents involving airframe failure or malfunction were often related to improper maintenance or assembly.

It is of interest to note that improper maintenance and assembly were cited as underlying factors in the airframe failure-involved fatal accidents of both home-built ultralights and home-built general aviation airplanes. However, design or material defect was cited only in ultralight fatal accidents involving airframe failure.

One concern about ultralight operations is the hazard they pose to other airspace users and to persons and property on the ground. The Safety Board reviewed data on ultralight accidents to determine the extent of property damage; the Board also requested and reviewed information about ultralights from the Aviation Safety Reporting System (ASRS) of the National Aeronautics and Space Administration. The study found that the overwhelming majority of the ultralight accidents in the Board's data base (80 percent) involved no property damage. Although property damage data do

2/ Single reciprocating engine general aviation airplanes in personal or instructional use reasonably resemble in a number of respects pertinent aspects of ultralights. The Safety Board's 1983 and 1984 automated accident data base was searched, and 229 fatal accidents were found which met the selection criteria. These selected fatal general aviation accidents were compared to ultralight fatal accidents.

not indicate, statistically, a major safety problem, two of the Safety Board's investigations 3/ did illustrate that ultralights, improperly operated, present the potential of a hazard to property and persons on the ground. The accident data also suggested that most ultralight accidents are not occurring where they pose a threat to controlled traffic, a major concern articulated by the FAA in promulgating rules for ultralight operations. However, these data do not provide the complete picture of the potential for airspace conflicts or hazards, since many dangerous situations do not result in accidents.

The Safety Board reviewed 39 reports about ultralights made to the ASRS between May 1978 and June 1984. Thirty-four reports involved individual problems with ultralight operations; the others were multiple reports of the same incident from different sources and general expressions of opinion about ultralight operations not related to specific incidents. Of the 34 incidents reviewed, 18 were reported before the promulgation of Federal ultralight regulations in October 1982, and 16 reports were made after the regulations went into effect. Thirty of the 34 incidents (88 percent) described near midair collisions or other hazardous potential conflicts with aircraft on or near airports, 13 of which involved potential conflicts with passenger-carrying aircraft. The four remaining incidents, not related to potential conflicts, described improper operation of ultralight vehicles, such as the performance of aerobatics in controlled airspace or flying over congested areas.

Another concern of the Safety Board about the operation of ultralights is that of their use for other than recreational purposes. The Safety Board's ultralight accident investigations have revealed that they are used for patrolling farm land; dual occupant instructional flying when exemptions from 14 CFR Part 103 have not been granted; herding sheep; police patrolling and surveillance work; and providing rides to passengers for hire. Clearly, the use of ultralights for purposes other than recreation violate the FAA's ultralight operating rules in Part 103. As indicated in the FAA's most recent ultralight Advisory Circular, AC 103-7--The Ultralight Vehicle, dated January 30, 1984, paragraph 14 (a):

The reason for allowing the operation of these vehicles without requiring aircraft and pilot certification is that this activity is a "sport" generally conducted away from concentrations of population and aircraft operations.

3/ Accidents: May 29, 1983, at Sumner, Washington, NTSB file No. 350; and June 19, 1983, at Norton, Massachusetts, NTSB file No. 2114.

Nonsport ultralight use undermines the FAA's rationale for only minimally regulating these vehicles and raises serious questions about the adequacy of the current regulations.

The FAA's premise that ultralights need not be regulated because the activity is a sport is not totally consistent with its policy of regulating other aviation activities which can be considered sport flying. For example, gliders and manned free balloons fall into the category of "civil aircraft" as defined by the FAA in 14 CFR Part 1. Therefore, gliders and manned free balloons are subject to Federal regulations for pilot certification, registration, operation (Part 91), and airworthiness certification. The FAA also has regulated amateur-built aircraft, which are used for sport and recreation. Pilots of amateur-built aircraft must be licensed; also, amateur-built aircraft must be registered and marked, inspected, and approved by FAA inspectors before initial operations and inspected annually thereafter.

The Safety Board's analyses of the ultralight accident data indicated that some ultralight owners and operators are not receiving important safety information. At present, safety information is provided through industry publications and, when available, through manufacturers' lists of ultralight purchasers. However, because ultralights do not have to be registered and there is no comprehensive list of owners, the owners of used ultralight vehicles often do not receive the information.

Upon issuing minimal ultralight regulations, the FAA urged the ultralight community to develop programs which would provide for a safe, orderly growth of ultralight activities. The FAA also provided some guidance to the ultralight community on the preparation of ultralight pilot and vehicle safety programs, primarily in a draft Advisory Circular (AC) 103-1 dated June 23, 1983, on "Industry Ultralight Safety Programs." The draft circular addressed pilot competency programs, vehicle airworthiness programs, and vehicle registration programs. It presented guidelines for determining pilot knowledge and skill, including designation of specific sections of the operating rules to be covered in written tests and specific maneuvers that should be performed as part of a skill demonstration. It also listed the elements which should be part of a vehicle airworthiness program, such as design criteria, manufacturing quality control, and material suitability, and listed important considerations for the collection, maintenance, and use of ultralight registration data.

Although the FAA never formally issued the AC, the draft has been used by aviation industry groups to establish safety programs. For example, the Air Safety Foundation of the Aircraft Owners and Pilots Association (AOPA ASF) established a Vehicle Pilot Competency and Registration Program based

on guidance in the draft circular. Also, the Powered Ultralight Manufacturers Association (PUMA), whose membership is open to manufacturers of powered ultralights and to suppliers of components and services, has developed reasonable vehicle airworthiness standards which adequately address the significant areas of vehicle strength and performance, fabrication methods, and production quality. The PUMA standards are patterned after the Federal standards for small airplanes (14 CFR Part 23). The FAA has recognized and encouraged the efforts of PUMA in developing the ultralight airworthiness standards. These voluntary safety programs developed by the ultralight community in response to the FAA's challenge are worthwhile. However, the level of participation in these programs by ultralight operators and manufacturers has been extremely low.

The ultralight accidents investigated by the Safety Board suggest that there are serious deficiencies in the knowledge and skills of ultralight operators; in the design, building, and maintenance of ultralight vehicles; in the notification of ultralight owners about safety defects; and in the rules governing the operation of ultralight vehicles. Although voluntary programs to address these safety problems exist within the aviation community, participation of ultralight owners, operators, and manufacturers is very limited, and this appears to have been an unsuccessful approach to accomplishing its goals. The Safety Board concludes that the potential for serious harm to the public is sufficient to include ultralights under 14 CFR Part 91-General Operating and Flight Rules, which govern the operation of all aircraft in the United States and to require minimum standards for pilot training and certification, vehicle registration, and vehicle airworthiness certification. The levels of the standards incorporated in the PUMA and the AOPA ASF programs appear to be appropriate levels for ultralight vehicle and operator certification.

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

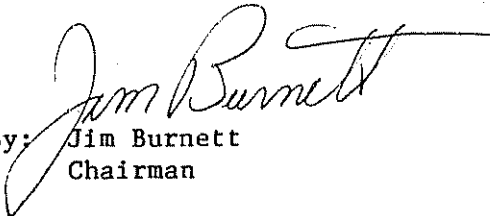
Establish minimum standards for airworthiness certification of ultralight vehicles which address design criteria, manufacturing procedures and quality control, materials specifications, and recurrent condition inspections. (Class II, Priority Action)(A-85-11)

Establish appropriate minimum requirements for certification of ultralight pilots, including demonstration of knowledge of flight rules, aeronautical knowledge, and flight proficiency. (Class II, Priority Action)(A-85-12)

Require the registration of ultralight vehicles and develop a mail notification system for effective dissemination of significant safety information to owners of both new and used ultralight vehicles. (Class II, Priority Action)(A-85-13)

Extend to ultralights the applicability of 14 CFR Part 91--General Operating and Flight Rules. (Class II, Priority Action)(A-85-14)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and BURSLEY, Member, concurred in these recommendations.


By: Jim Burnett
Chairman