

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

1078

ISSUED: July 16, 1980

Forwarded to:

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

SAFETY RECOMMENDATION(S)

A-80-56 through -58

As part of a recently completed special investigation ^{1/}, the Safety Board reviewed its files for every inadvertent landing gear retraction accident between 1975 and 1978. These accidents typically happened because the pilot was attempting to put the flaps control "UP" after landing, and moved the landing gear control instead. This inadvertent movement of the landing gear control was often attributed to the pilot's being under stress or distracted, and being more accustomed to flying aircraft in which these two controls were in exactly opposite locations.

Two popular light aircraft, the Beech Bonanza and Baron, were involved in the majority of these accidents. The Bonanza constituted only about 30 percent of the active light single engine aircraft fleet with retractable landing gear, but was involved in 16 of the 24 accidents suffered by this category of aircraft. Similarly, the Baron constituted only 16 percent of the light twin fleet, yet suffered 21 of the 39 such accidents occurring to these aircraft.

An examination of cockpits of the Bonanza and Baron revealed four problem areas which can lead to design-induced pilot errors. These problem areas include: (1) A lack of adequate "shape-coding" of the landing gear and flap control knobs to permit the pilot to differentiate between them on the basis of feel alone; (2) an arrangement of these two controls in nonstandard locations which increases the probability that the pilot will actuate one control while intending to actuate the other; (3) the location of the horizontal bar on which the control wheels are mounted so that it obscures the pilot's view and obstructs his reach of these two controls; and (4) the lack of a guard or latch mechanism over the landing gear control to prevent the pilot from activating this control unless the guard/latch is moved first.

^{1/} Special Investigation Report.—Design-Induced Landing Gear Retraction Accidents in Beechcraft Baron, Bonanza and other Light Aircraft. (NTSB-SR-80-1)

The human engineering problem areas documented in the report result largely from the fact that their basic instrument panel design is 35 years old. A great deal of knowledge about the effects of good design in preventing human error has been acquired since these aircraft were originally certificated, and more appropriate standards have been established. However, the current FAA regulations permit the continued manufacture of these aircraft under their previously issued type certificates.

On the basis of the evidence, the Safety Board concludes that the number of inadvertent landing gear retraction accidents in the Beech Bonanza and Baron is unacceptably high. Furthermore, these accidents result largely from various combinations of the four cockpit design deficiencies.

Newly manufactured Baron and Bonanza aircraft should be made to comply with the requirements of 14 CFR 23.777 with respect to standardized control locations. In addition, the installation of simple guards on landing gear controls also should be required on all newly manufactured Barons and Bonanzas (including the pressurized Baron). Simple landing gear control guards should also be retrofitted on previously produced Barons and late model Bonanzas, and a wheel-shaped control should be added to earlier model Bonanzas.

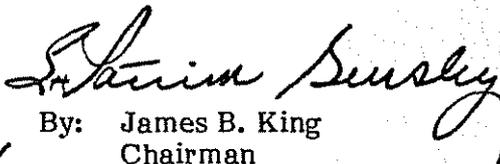
As a result of this special investigation, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Require after a specified date that all newly manufactured Beechcraft Baron and Bonanza models conform to 14 CFR 23.777 with respect to landing gear and flap control locations and that they have an adequate latch or guard to minimize inadvertent landing gear retraction. (Class II, Priority Action) (A-80-56)

Require that, after a specified date, previously manufactured Beechcraft Baron and Bonanza aircraft which do not conform to the landing gear and flap control arrangements outlined in 14 CFR 23.777 be equipped with an adequate guard or latch mechanism to prevent inadvertent actuation of the landing gear controls. (Class II, Priority Action) (A-80-57)

Require that after a specified date, the landing gear control switch on the pre-1963 model Beechcraft Bonanzas be modified to incorporate a wheel-shaped knob as outlined in 14 CFR 23.781. (Class II, Priority Action) (A-80-58)

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


By: James B. King
Chairman
for