



Beech Bonanza/Debonair In-flight Structural Failure Events 1962-2007

Prompted by initial reports of the in-flight break-up of a V35B Bonanza near Fresno, California on January 18, 2008, and numerous media and online discussions of the structural failure record of Bonanzas and the V-tail airplanes in particular, I reviewed the NTSB accident record and made a list of all Bonanza and Debonair in-flight break-up mishaps from 1962 through the end of 2007. The resulting list is at [Bonanza/Debonair In-Flight Break-ups](http://www.thomaspturner.net/inflight%20breakups%20NTSB.htm) (www.thomaspturner.net/inflight%20breakups%20NTSB.htm).

Please note that this list is **raw, uninterpreted data only**. All information comes from the NTSB reports. Because of time constraints no attempt has been made to interpret the data except to categorize each report by factors cited in the NTSB reports. Further, no attempt has been made to compare these cause factors to similar incidents where the airplane crashed but did not break up in flight, or compare these models of airplanes to other models that have encountered similar conditions. All comments are quoted directly from the NTSB reports, edited only for length.

This is not intended as a comparison between structural failure rates of different types of airplanes, nor is it an indictment of the types culled from the NTSB record. This record is for training purposes only with the hope patterns emerge that can help pilots of all types of airplanes avoid this, one of the most dreaded causes of aircraft accidents.

The record--a synopsis

Using the limited categorization of causes (from NTSB findings) the following general results appear:

In 1962-2007:

- there were 148 reports of in-flight structural failure in Beech models 33, 35 and 36 airplanes.
- of those, 136 were in Model 35 ("V-tail") aircraft and 12 were in Model 36 Bonanzas. There were no reports of in-flight break-ups in Model 33 Debonairs or Bonanzas.

Contributing factors for the 148 reports, in order of frequency:

attempted visual flight into IMC	55 reports
attempted flight in or near thunderstorms or towering cumulus	48 reports
airframe ice accumulation	13 reports
other/unknown causes*	11 reports
loss of control (IFR pilot on IFR flight plan)**	9 reports
severe or extreme turbulence (non-convective)	6 reports

partial panel (IFR pilot on IFR flight plan)

4 reports

attempted aerobatics

2 reports

*This includes the only known case where pilot incapacitation was a factor, when the pilot reportedly fell asleep and the airplane entered a spiral [I do not know how this determination was made].

** This and all other categories are exclusive, i.e., an IFR pilot who lost control in a thunderstorm while on an IFR flight plan is included in "thunderstorm" category, not "loss of control"; similarly, a VFR flight into a thunderstorm is included in the "thunderstorm" category, not "VFR into IMC".

Not obvious from this compilation but very apparent when reviewing the NTSB record, the most common conditions contributing to in-flight break-ups were also encountered in Models 33, 35 and 36 Bonanzas/Debonairs but did *not* result in airframe failure prior to impact. Unfortunately the outcome for pilots and passengers was the same.

Further study

Time has for now prevented me from carrying this study forward. Future research might focus on:

- comparisons between these and other makes and models of airplanes.
- comparisons between these reports and accidents in similar flight conditions, e.g., thunderstorm penetrations: how many result in structural failure in flight, and how many aircraft remain intact until impacting the ground or obstacles.
- what effect, if any, these milestones had on the rate of in-flight break-ups:
- release of various Airworthiness Directives aimed at addressing potential structural failure;
- reduction of the minimum pilot experience required for the Instrument rating from the original 250 hours;
- widespread introduction of airborne spferics (thunderstorm detection) devices;
- widespread introduction of near-real-time weather radar data uplinks.

I would appreciate anyone who is interested in seriously pursuing one or more of these avenues of study contacting me at mastery.flight.training@cox.net . I'll provide as much data support as possible and try to coordinate and prevent duplication of effort among researchers.

Thomas P. Turner, M.S. Aviation Safety, MCFI
Mastery Flight Training, Inc.
mastery.flight.training@cox.net

©2008 Mastery Flight Training, Inc.