

Safety Communique

Beech
Hawker

September, 1993

TO ALL BEECHCRAFT WHOLESALERS, AVIATION CENTERS, INTERNATIONAL DISTRIBUTORS AND DEALERS, OPERATORS AND OWNERS OF RECORD FOR ALL MODELS:

SUBJECT: FLUTTER

INSTRUCTIONS FOR PILOTS TO INSPECT CONTROL SURFACES DURING PRE-FLIGHT INSPECTION AND INSTRUCTIONS FOR MECHANICS TO INSPECT CONTROL SURFACE CABLE TENSION, ATTACHMENT SECURITY AND BALANCE LIMITS MUST NOT BE IGNORED.

Beechcraft has recently received reports of three aircraft sustaining structural damage to the empennage as a result of flutter. None of the occurrences resulted in an accident. Flutter is a phenomenon that can occur when an aerodynamic surface begins vibrating. The energy to sustain the vibration is derived from air flow over the surface. The amplitude of the vibration can (1) decrease, if airspeed is reduced; (2) remain constant, if airspeed is held constant and no failures occur; or (3) increase to the point of self destruction, especially if airspeed is high and/or is allowed to increase. Failure or destruction of control surfaces can lead to an in-flight breakup of the airplane.

Aircraft are designed so that flutter will not occur in the normal operating envelope of the airplane as long as the airplane is properly maintained. Owners and operators of aircraft have the primary responsibility for maintaining their aircraft. To fulfill that responsibility, it is imperative that all aircraft receive a thorough pre-flight inspection. Further, owners should take their aircraft to mechanics who have access to current technical publications and prior experience in properly maintaining that make and model aircraft.

In the case of any aircraft, decreasing the damping and stiffness of the structure or increasing the trailing edge weight of control surfaces will tend to cause flutter. If a combination of those factors is sufficient, flutter can occur within the normal operating envelope. Examination of the three aircraft following these incidents revealed that in all three cases the empennage control surfaces were out of balance as a result of repainting, substitution of materials, or both.

Improper tension on control cables or any other loose condition in the empennage can also cause or contribute to flutter. In one case, an upper stabilizer bolt was loose. In another case, spanwise movement of a control surface was approximately 1/8 inch. In another, trim tab hinge wires were improperly installed. In each of these three occurrences, the empennage sustained structural damage which precluded accurate determination of control cable tension.

Although these three occurrences involved the Bonanza model 35 type aircraft, any make and model of aircraft can experience flutter if not properly maintained. Proper flight control surface maintenance is imperative to the continued safe operation of all airplanes. Pilots should pay particular attention to control surface attachment hardware during pre-flight inspection. Looseness of fixed surfaces or movement of control surfaces other than in the normal direction of travel should be rectified before flight.

ALL MODELS-102

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Additionally, the owner should make certain that control cable tension inspections are performed as outlined in the applicable Beech Inspection Guide. Worn control surface attachment hardware must be replaced. Any repainting or repair of a moveable control surface will require a verification of the control surface balance before the airplane is returned to service.

EMERGENCY SAFETY INSTRUCTIONS

If a flutter situation or noticeable vibration in the control column or rudder pedals is encountered in flight, the procedure to follow is:

1. IMMEDIATELY REDUCE AIRSPEED.
2. RESTRAIN THE CONTROLS OF THE AIRCRAFT UNTIL THE VIBRATION CEASES.
3. FLY AT THE REDUCED AIRSPEED AND LAND AT THE NEAREST SUITABLE AIRPORT.
4. HAVE THE AIRPLANE INSPECTED FOR AIRFRAME DAMAGE, CONTROL SURFACE ATTACHING HARDWARE CONDITION/SECURITY, TRIM TAB FREE PLAY, PROPER CONTROL CABLE TENSION, AND CONTROL SURFACE BALANCE BY A DIFFERENT AND FULLY QUALIFIED MECHANIC.