NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: JUN 19 1984

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

SAFETY RECOMMENDATION(S)
A-84-63

On June 4, 1984, a Cascade Airways' Beech 1900C, N123CZ (S/N UB-10) was involved in an incident shortly after it departed the Spokane International Airport, Spokane, Washington, as Flight 104. The flight was operating under 14 CFR 135, and there were three passengers and two flight crewmembers on board. During climbout from runway 21, at an altitude of about 500 feet, smoke, fire, and sparks erupted from the lower and upper forward corners of the circuit breaker panel on the first officer's sidewall. At the time of the incident, instrument meteorological conditions existed above 900 feet a.g.l.; however, the flight remained under the overcast.

The captain took control of the airplane from the first officer because of the proximity of the fire to the latter. The captain turned off the main electrical power and generator switches, contacted the airport control tower on the No. 1 communications radio using the direct-power access feature, and requested an immediate return and landing on the nearest runway. Cabin pressure was vented and the cockpit side windows were opened to clear smoke from the cockpit and cabin. After the captain landed the airplane on runway 3, the fire self-extinguished. There were no injuries to the passengers or flightcrew. The airplane sustained minor damage.

The National Transportation Safety Board's continuing investigation of the incident revealed severe arcing and burning of wires which pass through the forward opening in the horizontal support intercostal to which the circuit breaker panel is hinged. These wires included one of the power supply cables, a wire bundle for various circuits, and the diode leads. Severe arcing damage was found on the edge of the forward bulkhead adjacent to the circuit breaker panel. The edge antichafe covering — a caterpillar grommet -- was burned away. This grommet stopped about 3 inches above the panel hinge because of a small flange and had not covered completely the edge of the bulkhead. Except at its attachment screw, the Adel clamp, which had secured the wire bundle to the lower forward corner of the circuit breaker panel, was totally destroyed by arcing. The insulation on the diode leads had been burned away where they traversed the inside lip of the support intercostal. The caterpillar grommet covering the intercostal lip in this area was destroyed by heat, and a notch had been burned in the lip. The lower forward breaker bus bar (closest to the Adel clamp) was distorted due to heat.

Inspection of the circuit breaker panel and associated wiring installation on another airplane (S/N UB-2) revealed that in that case the installation included nylon sleeves on some but not all of the electrical wiring. For instance, the power supply cables had sleeves for antichafe protection instead of the caterpillar grommet on the metal edges of the opening. However, the diode leads had no antichafe protection and some openings in the support structure had no antichafe protection. Also, it was determined that experimental and prototype systems personnel had accomplished this installation. However, on the incident airplane, production systems personnel had installed the circuit breaker panel and associated wiring using somewhat different procedures.

The Safety Board is aware that the Federal Aviation Administration and Beech Aircraft Corporation have begun to take action to solve the problems already identified in the investigation of this incident. Three aspects of the production installation of the circuit breaker panel require immediate and comprehensive action:

- The severity of the thermal damage to the Adel clamp and adjacent breaker bus bars indicates that these components may have come into contact, causing a short circuit which ultimately melted the clamp and rubber caterpillar grommet as well as the insulation on the wiring held by the clamp.

- Complete antichafe protection was not provided for electrical wiring to and from the circuit breaker panel in the production (or the prototype) installation. If a caterpillar grommet is used, it should cover all exposed metal edges of support structure. If sleeving of wire bundles is used, it should cover all wires which pass through openings in support structure.

- Adequate clearance must be provided between the four diode leads near the forward portion of the circuit breaker panel to prevent crimping during closure of the panel.

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

> Require the Beech Aircraft Corporation to modify the main circuit breaker panel installations in all Model 1900C airplanes (1) to prevent contact between the Adel clamps, which hold the circuit wire bundles in place at the lower panel corners, and the adjacent circuit breaker bus bars, (2) to provide complete antichafe protection for electrical wiring to and from the circuit breaker panel where the wires pass through the support intercostal openings, and (3) to eliminate the possibility of crimping the adjacent diode leads during closure of the circuit breaker panel. (Class I, Urgent Action) (A-84-63)

BURNETT, Chairman, GOLDMAN, BURSLEY and GROSE, Members, concurred in this recommendation.

By: Jim Burnett
Chairman