

Log 7009



National Transportation Safety Board

Washington, D. C. 20594

Safety Recommendation

Date: February 21, 1989

In reply refer to: A-89-6

Honorable T. Allan McArtor
Administrator
Federal Aviation Administration
Washington, D.C. 20591

A review by the National Transportation Safety Board of service difficulty reports (SDRs) applicable to Beech models A36TC and B36TC airplanes, which both use Teledyne Continental Motors (TCM) TSIO-520-UB engines, has disclosed a potentially hazardous condition which requires remedial action by the Federal Aviation Administration (FAA). Between 1981 and 1988, 19 SDRs were submitted to the FAA regarding the engine exhaust/turbocharger systems in these airplanes. Seventeen SDRs reported cracking, splitting, or separation of the welded tubular joints of the turbocharger inlet assembly, TCM part No. 642668. Some cracks were reported to be several inches long, and one report indicated that hot exhaust gases spewing from the cracks burned/destroyed adjacent aircraft wiring. A notice regarding the cracked assemblies was published in June 1985 in FAA Advisory Circular (AC) 43-16, *General Aviation Airworthiness Alerts*.

The Beech Aircraft Corporation indicates that the cracks result from preloading the turbocharger inlet assembly during installation. In Beechcraft Service Communique No. 70, *A36TC and B36TC Turbocharger Inlet Assembly*, issued October 28, 1983, Beech provides an assembly procedure designed to avoid cracks resulting from preloading and recommends that welded joints be inspected for cracks at the next scheduled inspection and every 100 hours thereafter. The Safety Board, noting that 12 SDRs were filed between 1985 and 1988, concurs with the service communique.

In 1985, TCM developed an improved turbocharger inlet assembly, part No. 646795, a casting which was determined to be more tolerant of preloading and misalignment during assembly to the exhaust system. Factory installation of the new turbocharger inlet assembly was initiated in 1985-model B36TC airplanes, and the improved assembly was subsequently provided as a replacement part for the obsolete welded assemblies in previously manufactured A36TC and B36TC models. It is estimated that the improved assembly has been installed in only about 10 percent of these airplanes.

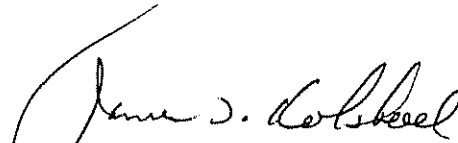
Cracks in the improved inlet assemblies supposedly installed in 1983-model B36TC airplanes were reported in only 2 of the 19 SDRs. Both SDRs were filed in 1988. However, the Safety Board suspects that the part numbers of these inlet assemblies may have been erroneously reported because only the newest assembly part number is referenced on TCM's current TSIO-520-UB engine exhaust system parts list. For example, some other SDRs have referred to cracks in the "welded joints" (sic) of these TCM part No. 646795 cast assemblies.

No accidents have yet been attributed to cracking or separation of the obsolete welded turbocharger inlet assemblies. Nonetheless, frequent cracking of these assemblies, which may allow hot exhaust gases to be spewed directly into the engine compartment adjacent to fuel and oil lines and critical aircraft/engine wiring, is an unacceptable risk. The Safety Board believes that eventually, as a result of material degradation due to exhaust gas erosion and/or metal fatigue, splitting or separation of the inlet assembly tubes may result in a catastrophic engine malfunction or in-flight fire.

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

Issue an airworthiness directive applicable to Beech models A36TC and B36TC airplanes requiring within the next 100 hours of flight and every 100 hours thereafter an inspection of turbocharger inlet assemblies, Teledyne Continental Motors (TCM) part No. 642668, for evidence of cracked weld-joints. If cracks or other substantial defects are discovered, the welded assembly should be removed and replaced with TCM part No. 646795 cast inlet assembly before further flight. The installation of either assembly should be performed in accordance with Beechcraft Service Communique No. 70 regarding this subject. (Class II, Priority Action) (A-89-6)

KOLSTAD, Acting Chairman, and BURNETT, LAUBER, NALL, and DICKINSON, Members, concurred in this recommendation.



By: James L. Kolstad
Acting Chairman