

Log 2476



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: April 11, 1994

In reply refer to: A-94-77 and -78

Honorable David R. Hinson
Administrator
Federal Aviation Administration
Washington, D C 20591

On July 23, 1993, a Cessna Skyhawk Model 172N, N733XS, en route from Manhattan, Kansas, to Wheeling, Illinois, lost all engine power several miles from its destination. The airplane had been rented from a fixed base operator and was being operated under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91. The pilot attempted to perform an emergency landing in a cornfield at Long Grove, Illinois, but the airplane struck power lines during the approach and crashed to the ground, coming to rest inverted. The four persons aboard received serious injuries. The Safety Board's subsequent investigation and examination of the airplane disclosed that the loss of engine power was caused by fuel exhaustion. The airplane was equipped with standard fuel tanks with a total capacity of 43 gallons.

The airplane was originally manufactured and equipped with a 160 horsepower Lycoming Model O-320-H2AD engine but had been modified in accordance with Supplemental Type Certificate (STC) No. SA703GL and was configured with a 180 horsepower Lycoming Model O-360-A4A engine at the time of the accident. The STC also provides for the installation of similar engines in Cessna Model 172I, 172K, 172L, 172M, and 172P airplanes. Installation of the larger engine allows the airplane's maximum operating gross weight to be increased from 2,300 pounds to 2,550 pounds. The original Cessna pilot operating handbook (POH) for the Model 172N was retained and carried in the airplane. The FAA-approved supplemental airplane flight manual (AFM) that must also be carried in airplanes modified by this STC referred to the airplane's increased maximum gross weight, and the required display of limitations placards concerning flap travel and the 180 horsepower engine, but indicated, based on limited type design certification requirements, that there was no change in emergency procedures, normal procedures, or aircraft performance.

A computer generated printout with flight planning information pertinent to the accident flight was located in the wreckage. However, the data were based on cruise

performance/fuel consumption information in the original Model 172N POH. As a result, the printout performance summary, based on a cruise altitude of 6,000 feet and 75 percent engine power, erroneously indicated that the airplane's 40 gallons of usable fuel aboard would have been sufficient for a total of 4.7 hours of flight, including the appropriate required reserve fuel. The actual elapsed time en route from engine start to fuel exhaustion, including time required to deviate due to weather, was calculated from aircraft records and Hobbs meter readings to be 4.0 hours. The pilot told local authorities that he did not know what happened but, based on his preflight planning, "...we couldn't have run out of gas."

The supplemental AFM and a power setting table for the Lycoming O-360 series 180 horsepower engine were both found in N733XS but neither contained any cruise performance or fuel consumption data. Except for color coding the engine's operating limits on the tachometer and oil instruments, the engine modification does not require the STC holder to provide any new or revised engine performance or operating information. Although certain performance of the increased-gross-weight airplane with the larger engine, including rate-of-climb, might be similar to that of the original Model 172N, cruise performance/fuel consumption differs markedly. For example, the cruise performance tables in the Model 172N POH, for an altitude of 6,000 feet and 75 percent engine power, indicate fuel consumption to be 8.4 gallons per hour. Cruise performance tables for the same conditions for the Cessna Model 172Q, a similar airplane originally manufactured with the Lycoming O-360 series 180 horsepower engine, indicate fuel consumption to be 10 gallons per hour, or 19 percent higher. As a result, the maximum range and endurance of the Model 172N with the larger engine is reduced significantly.

The FAA does not require cruise performance, fuel consumption, or range profile data to be furnished for certification of the Cessna Model 172N or as part of the approved AFM material. Nonetheless, Cessna POHs for the 172 series airplanes, and most other airplanes, routinely include these data since they are essential for safe and efficient flight planning and range estimation, particularly in extended range operations such as the one involving N733XS. Moreover, the same section of these POHs also contains the certification performance data that the FAA requires Cessna to furnish, e.g., takeoff/landing distance, rate-of-climb, etc. Therefore, the Safety Board believes that the phrase "Performance - No Change" contained in the supplemental AFM associated with STC No. SA703GL, and referring only to certification criteria, is misleading and may easily be misconstrued to mean no change in any of the airplane's performance characteristics, including cruise performance and engine fuel consumption.

To assure the same level of safety originally provided by the Cessna Aircraft Company, any facet of airplane performance made obsolete by the incorporation of STC No. SA703GL should be stricken or removed from the applicable AFM/POH and replaced, by the STC holder, with appropriately revised, equivalent data in the supplemental AFM. Moreover, the placard referring to STC No. SA703GL that is required to be displayed in the airplane should be amended by including an advisory statement regarding this obsolete supplemental performance data.

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

Require that supplemental airplane flight manuals issued in conjunction with STC No. SA703GL for installing Lycoming O-360 series 180 horsepower engines in certain Cessna 172 series airplanes be amended to include appropriate airplane cruise performance, range/endurance, and engine fuel consumption data for the 180 horsepower engine to supplant that supplied by the Cessna Aircraft Company for the original 150/160 horsepower engine installation (Class II, Priority Action)(A-94-77)

Amend the currently required aircraft placard referring to installation of a Lycoming O-360 series 180 horsepower engine per STC No. SA703GL to include the statement "Cruise performance, range/endurance, and fuel consumption data originally supplied by Cessna is no longer applicable." The obsolete data should be stricken or removed from any original airplane flight manual/pilot operating handbook that is carried in the airplane. (Class II, Priority Action)(A-94-78)

Chairman VOGT, Vice Chairman COUGHLIN, and Members LAUBER, HAMMERSCHMIDT, and HALL concurred in these recommendations.



By: Carl W. Vogt
Chairman