

Log 1619

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: August 31, 1983

Forwarded to:

Honorable J. Lynn Helms
Administrator
Federal Aviation Administration
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-83-59 through -61

About 2010 central daylight time on August 27, 1983, Scheduled Skyways, Inc., Flight 478, a Swearingen SA 226-TC Metro airplane, N503SS, caught fire while taxiing from the gate to the takeoff runway at Hot Springs, Arkansas. The fire began in the cockpit and rapidly engulfed the entire airplane. The captain, first officer, and two passengers evacuated the airplane without injury. The fire gutted the airplane down to the wingline from the cockpit to the empennage.

The engines were started without difficulty, and the airplane left the Hot Springs terminal for runway 5. While taxiing to runway 5, the first officer, who was at the airplane controls, noticed that the "peanut light" for the altimeter was not illuminated. The captain took control of the airplane, and the first officer reset the altimeter "peanut light." As he reset the light, he noticed a blue spark behind the right side of the instrument panel. About 1 second later, the first officer heard a "muffled thump" and got a shock in his right arm and leg, which were resting against the right side of the cockpit. Simultaneous with the shock, he saw flames in the lower right-hand part of the instrument panel; the flames progressed rapidly along the right side of the fuselage along the floor line to the rear of his seat.

The first officer got out of his seat, grabbed the fire extinguisher, and looked back to see the right side of the cockpit engulfed in flames. It was his opinion that the fire could not be controlled using the fire extinguisher. The captain instructed him to go back and evacuate the passengers. As the first officer went aft, he opened the passenger door on the left forward side of the fuselage, walked farther aft, and opened the left overwing exit. During this time, the captain had stopped the airplane, and the first officer and the two passengers went out the overwing exit. According to the first officer, about 35 to 40 seconds had elapsed from the time he first saw flames until he and the two passengers left the airplane.

According to the captain, there was thick black smoke associated with the flames at the lower right portion of the instrument panel. After he directed the first officer to go aft, he stopped the airplane and began to accomplish the emergency engine shutdown, but by this time smoke had filled the cockpit. He "hit" the stop switches to shut down the engines and put the propellers into reverse. By this time, the smoke had become so intense that he had to leave the cockpit. The captain exited the airplane through the forward passenger door in front of the turning propeller. When he got on the ground, he looked back at the airplane and saw the cockpit engulfed in flames.

The circumstances of the Scheduled Skyways, Inc., accident are similar to those of an accident which occurred on October 15, 1982, at Palm Springs, California. That accident involved a Swearingen SA 226-TC, N63SA, operated by Sun Aire Lines, which sustained substantial damage when a cockpit fire erupted as the flight was preparing to depart the gate. Two crewmembers and 16 passengers were aboard the airplane.

With respect to the Sun Aire accident, the engines were running and electrical generators were on the line when the crew detected smoke in the cockpit. Before any action could be taken, flames were observed in the area of the copilot's side console. The pilot began shutdown procedures while the copilot assisted the evacuation of passengers. Passengers exited through emergency hatches and all successfully evacuated the airplane; one passenger received minor injuries when she jumped from the wing to the ground.

Both Sun Aire crewmembers stated that the fire began as the copilot was attempting to illuminate his instrument lights with the rheostat on the right-hand forward console. After the flames were detected, the fire rapidly progressed to an inferno, spewing thick black smoke. The fire was extinguished by line personnel using dry chemical fire extinguishers after the passengers and crew had deplaned.

The investigation of the Sun Aire accident disclosed that the electrical wire bundles and components beneath the right-side cockpit console were coated with an oily residue. Further, investigators found that the right wheel brake hydraulic line, which is located below the console, was crystalized and brittle -- a condition which could have been caused by work hardening due to vibration or from heat. The investigators concluded that the residue and the condition of the right brake hydraulic line indicated that there was a hydraulic leak in the area before and possibly during the fire; they also concluded that the fire began when vaporized hydraulic fluid escaping from the pressurized hydraulic line was ignited by arcing of the copilot's instrument light rheostat control. The flames melted a crew oxygen supply line causing oxygen under about 70 psi to be discharged into the fire. The resultant blow-torch effect created a vortex behind the side panel causing rapid propagation of the fire.

The brake system on the Sun Aire airplane contained a mineral-base hydraulic fluid even though a more fire-resistant fluid was recommended by the Fairchild Aircraft Corporation in Service Bulletin 32-018 dated March 6, 1978. The type of fluid used in the Scheduled Skyways, Inc., airplane has not yet been determined; however, the carrier has advised the Safety Board that the system contained a fire-resistant fluid.


Because of the catastrophic potential of this type of accident, the Safety Board recommends that the Federal Aviation Administration:

Issue an Emergency Airworthiness Directive to operators of Swearingen SA 226-TC Metro airplanes to require an immediate inspection of hydraulic tubing and oxygen lines in the vicinity of the electrical circuit breaker panel on the copilot's side console and behind the instrument panel. The inspection should be conducted according to a procedure adequate to detect leakage or stress cracks which could cause future leakage when the systems are pressurized. Require immediate replacement of hydraulic or oxygen lines exhibiting defects. Further, require operators to comply with Fairchild Aircraft Corporation Service Bulletin 32-018 to use fire-resistant hydraulic fluid. (Class I, Urgent Action) (A-83-59)

Determine the applicability of this problem and corrective action to other models of Swearingen airplanes, and if necessary, include these airplane models in the Airworthiness Directive. (Class I, Urgent Action) (A-83-60)

In conjunction with the manufacturer, determine the susceptibility of the hydraulic tubing in Swearingen SA 226-TC Metro airplanes to stress or fatigue cracking, particularly where such tubing is routed in the vicinity of electrical circuitry, and take appropriate action to establish life limits, to replace tubing with assemblies not susceptible to stress or fatigue failure, and if necessary, to reroute tubing to assure that leakage will not present a fire hazard. (Class II, Priority Action) (A-83-61)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and McADAMS and ENGEN, Members, concurred in these recommendations. BURSLEY, Member, did not participate.


By Jim Burnett
Chairman