

1
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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: October 26, 1982

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

SAFETY RECOMMENDATION(S)
A-82-142

On January 8, 1981, a Sahsa Airlines Lockheed Electra L-188, Registration HR-SAW, crashed in visual meteorological conditions while departing La Aurora International Airport, Republic of Guatemala. The three members of the flightcrew and three cabin attendants received fatal injuries.

The airplane was being flown to the company's maintenance base in Tegucigalpa, Honduras, as a three-engine ferry flight and had taken off with the No. 1 propeller in the feathered position. Shortly after becoming airborne, the airplane yawed to the right momentarily, entered a steep left bank, and lost altitude. The airplane's left wing tip struck treetops and the airplane crashed about 4 miles from the airport.

The investigation was conducted by the Guatemala Civil Aviation Authorities with assistance from the National Transportation Safety Board and the Lockheed Aircraft Corporation. The flight data recorder on the airplane was inoperative but a readout of the cockpit voice recorder by the Safety Board disclosed that the pilot lost control of the airplane almost immediately after initiation of the the landing gear retraction cycle. At this time, the pilot shouted, "Hey, what happened? . . . the flight controls. . . the flight controls man . . . what happened?" The Guatemalan authorities attributed the accident to the loss of aerodynamic control because of the loss of electrical priority "A" bus and the consequent limited hydraulic power available to the hydraulic boosted flight controls during retraction of the landing gear.

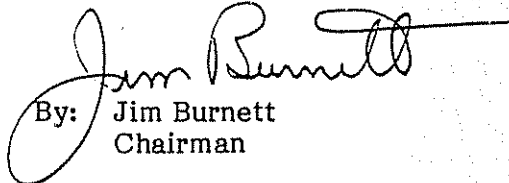
Although the loss of electrical "A" bus could not be verified due to extensive destruction of the airplane, the only malfunctions which could have caused the hydraulic system to fail to meet the system demand during the landing gear retraction cycle after takeoff would have been the failure of the priority "A" bus to provide the electrical power to operate hydraulic pumps Nos. 1A and 2, or failures in the associated hydraulic systems. A Lockheed operation information letter, dated June 5, 1961, revealed that during a series of tests conducted with the L-188 to determine the effect on elevator and rudder control forces during gear retraction after takeoff with one hydraulic pump operating, the pressure dropped to 700 psi and the elevator control forces were increased to 180 pounds with the elevator trim set at zero, as was the case in this accident. If the malfunction was in the hydraulic system, this accident might have been prevented if the crew had repositioned the landing gear handle to the neutral position. Such action would have made available the existing hydraulic fluid volume and pressure to the flight controls and thereby would have alleviated excessive control forces.

The Safety Board is aware that the Lockheed Aircraft Corporation recently issued an operation information bulletin which provides guidance to operators on functions of the hydraulic system when the L-188 is flown with less than fully operational electrical and hydraulic systems. This guidance contains precautions that must be taken when retracting the landing gear with only one hydraulic pump available and includes the admonition that the landing gear handle must be immediately returned to neutral should the flight controls become difficult to operate under such circumstances. However, the Safety Board is also aware that the L-188 hydraulic system is designed to accommodate a system priority valve. This valve, an optional item, assures that the flight control boosters are given hydraulic priority over other system demands whenever the airplane's hydraulic system capability becomes marginal. Most foreign-certificated L-188 airplanes have this valve installed, but it is not normally included on L-188 airplanes certificated in the United States. We believe that this valve should be a standard item on all L-188 airplanes certificated in the United States.

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

Issue an Airworthiness Directive requiring that Lockheed L-188 airplanes be modified by incorporating a hydraulic pressure "priority valve." Such a valve should assure adequate hydraulic pressure to the airplane's primary flight controls in the event hydraulic system capability falls below specified standards. (Class II, Priority Action) (A-82-142)

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


By: Jim Burnett
Chairman