

## CIVIL AERONAUTICS BOARD

## ACCIDENT INVESTIGATION REPORT

Adopted: August 10, 1948

Released: August 11, 1948

## PAN AMERICAN AIRWAYS—ACCRA, GOLD COAST, AFRICA—MARCH 24, 1948

A Lockheed Constellation of United States registry, NC 88833, made a successful wheels-up landing at Accra, Gold Coast, Africa, March 24, 1948, at 1520 GMT.\* The aircraft had departed LaGuardia Field, New York City, New York, as Pan American Flight No. 150 at 1356, March 22, 1948, bound for Johannesburg, Union of South Africa, with scheduled stops at Santa Maria, Azores, Lisbon, Portugal, Dakar, Senegal, Accra, Gold Coast; and Leopoldville, Belgian Congo.

The flight departed Santa Maria at 2342, March 22, under the command of Captain A. L. McCullough, following a routine flight from New York. On arrival at Lisbon difficulty was experienced in extending the nose wheel gear to the lock-down position. This difficulty, however, was overcome by applying a few strokes to the emergency extension handle and a landing was made at 0340, March 23.

The aircraft was inspected and serviced, and departed Lisbon for Dakar at 0815, March 23. On arriving at Dakar the nose wheel again failed to extend to the lock-down position in a normal manner. It was, however, again successfully extended by the operation of the manual emergency extension handle, and the Dakar landing was accomplished at 1545, March 23. Because of the difficulty encountered with extension of the nose wheel both at Lisbon and Dakar, Captain McCullough called for a thorough inspection of the unit before proceeding further. This necessitated a delay in schedule.

The aircraft was jacked up and several nose wheel operational tests were conducted using both emergency extension and normal system pressures. The system pressure was obtained by the use of an outside auxiliary hydraulic pressure unit. All of these tests were normal

with the exception that the gear extensions appeared to be a little slower than usual which fact was attributed to the low pressure, low capacity auxiliary unit being used. On the basis of these satisfactory operational tests the aircraft was cleared for flight to Accra.

The flight departed Dakar at 0615, March 24, arriving over Accra the same day, at 1135, at which time the nose wheel again failed to extend to the lock-down position. After the next three hours or so had been spent in the vicinity of the airport in unsuccessful attempts to extend the gear, Captain McCullough elected to make a wheels-up landing. Necessary preparations for such an undertaking were made and at 1520 a landing was effected on a laterite strip alongside the runway without injury to passengers or crew or extensive damage to the aircraft.

After the aircraft was raised it was found that the extension of the nose wheel gear was being restricted by the hydraulic actuating cylinder, the piston of which did not extend sufficiently to permit the engagement of the lock-down device. This actuating cylinder, serial #255, was removed and replaced by a new one from stock. Following this installation the nose wheel functioned normally as did all hydraulic units in the landing gear system. Upon disassembly of the defective cylinder it became evident that the piston had not been machined in accordance with the manufacturer's specifications and drawing #405371, which calls for a 1/16" 45° chamfer around the periphery of the piston ends on both the retract and extend sides.

The fact that this 1/16" chamfer had not been made resulted in the piston end becoming peened to a slightly larger diameter on the retract side due to its repeated bottoming on the cylinder end and this in turn resulted in the scoring of both piston and cylinder. The damaged surfaces of both piston and cylinder and

\*All times referred to herein are Greenwich Mean and based on the 24-hour clock.

the accumulation of metal chips eventually limited the full extension of the nose wheel actuating mechanism.

Maintenance records of the aircraft indicated that the cylinder removed had been installed new on September 18, 1947, and that it had operated satisfactorily throughout the 1,165 hours the aircraft had flown between that date and its arrival over Lisbon on March 23.

#### Probable Cause

Upon the basis of available evidence the Board finds that the probable cause

of this accident was failure of the nose wheel actuating mechanism which necessitated a landing with the wheels retracted.

BY THE CIVIL AERONAUTICS BOARD:

/s/ JOSEPH J. O'CONNELL, JR.

/s/ JOSH LEE

/s/ HAROLD A. JONES

/s/ RUSSELL B. ADAMS

Ryan, Vice Chairman, did not participate.