No. 58

Philippine Air Lines, Inc., PI-C55, DHC-3 Otter, crashed on 11 December 1957 shortly after taking-off from Misamis Airport, Ozamis City, The Philippines. Report released by the Civil Aeronautics Administration, Dept. of Public Works and Communications, Republic of The Philippines.

## Circumstances

At approximately 1310 hours PI-C55 took off from Misamis Airport for Pagadian on a scheduled flight with a pilot, nine passengers and two infants on board. Following a normal take-off and climb, the aircraft, at an altitude of 75 ft, was seen on a steep climb followed by a steep turn to the left. It then suddenly lost altitude, hit two trees and crashed in a nose-down attitude. Fire broke out immediately. The pilot and one passenger were killed.

## Investigation and Evidence

At the time of the accident the weather was clear. The prevailing wind was, however, strong and gusty, coming from the North approximately 20 to 25 knots per hour.

Witnesses testified that the aircraft took off from the south end of the runway at a point parallel to the wind cone. * The crash site was a coconut plantation situated on the left side of the runway approximately 2 000 ft from the point of take-off.

The fuselage from the firewall up to the radio equipment was completely ravaged by fire. The engine together with the engine mount and propeller were detached from the firewall and were lying inverted on the ground. The propeller blades were bent, the cylinder heads of cylinders No. 5 to 8 were broken and the generator was detached from the mounting base.

The left and right wings were burned about three feet from the wing roots. The right outboard flap and right aileron, detached during the first impact, were 63 and 71 feet away from the right wing.

The clock was found and the time indicated was 1312 hours. The indication of the fuel pressure gauge was below zero. The temperature indicated by the oil temperature gauge was 28°. The flaps were extended.

Examination of the engine revealed nothing to indicate any material failure.

The carburettor, when bench tested, was found to have excessive leak. Subsequent disassembly of the component parts revealed that one of the floats was found cracked circumferentially along the soldered joints. The opening allowed the fuel to fill the float, resulting in the needle valve always being in the open position. The subject carburettor had been exposed to fire in the accident as evidenced by the carbonaceous coating present along the area nearest to the subject float and the black discolouration of the carburettor body itself.

The separation of the two halves comprising the float is believed to have been caused by the melting of the solder due to the heat when the aircraft burned.

Three cylinders located on the left side of the engine were found cracked. The crack could, however, be attributed

* The wind cone is located approximately 300 metres from the south end of the runway.
Note: Total usable length of the runway is approximately 900 metres.

as a result of the second impact as coconut fibres were found embedded in these cylinders.

Inspection and maintenance of the aircraft had been properly accomplished according to the approved schedule of the airline.

The flight manifest showed that the aircraft was carrying a total load of 804 kilogrammes, i.e. 535 kilogrammes representing the weight of passengers and 269 kilogrammes of cargo.

Checks made by the Board revealed, however, that the manifest was not reflective of the correct weights of the actual load including passengers' weight on board the aircraft and did not include the pieces of baggage which the passengers carried by hand.

The airline porters testified that they loaded all the cargo in the rear cargo compartment except three bundles of newspapers and one bundle of electrical moldings with an approximate weight of 40 kilogrammes which were loaded in the passengers' compartment.

The aircraft's gross weight at take-off was within the maximum allowable payload of 1 083 kilogrammes considering that the aircraft had only 130 gallons of gas. With nine passengers a maximum of 125 kilogrammes of load could be placed in the rear cargo compartment.

It was gathered that most of the passengers were seated in the rear.

Based on these findings, computations were made on the centre of gravity of the aircraft, and it was found that the aircraft's centre of gravity limit was considerably exceeded. With this attendant condition the pilot may have experienced extreme difficulty in maintaining the longitudinal stability of the aircraft after becoming airborne. This was further aggravated by the cross wind, gusty air and the high ambient temperature.

The Board also considered that the application of the stick forces and trims were not sufficient to regain control of the aircraft at low speed, and the tail heavy condition of the aircraft which resulted in an unintentional steep climb to a point where a partial or full stall was entered into, followed by an uncontrolled steep turn to the left, culminated in the crash.

## Probable Cause

The probable cause of the accident was the uncontrollable stall at low altitude which resulted from the abrupt steep climb immediately after take-off.

Contributing factors were:

1. The improper loading of the aircraft; and
2. The prevailing gusty wind with a relatively high ambient temperature.

## Recommendation

The Board recommended that the "Otter" operation of PAL be temporarily suspended until a thorough re-study and evaluation of the airline operations practices had been made by the company to the satisfaction of the CAA. Such studies would include associated activities of the traffic, operations and maintenance departments of PAL.

As a result of this recommendation PAL voluntarily suspended the Otter operations on 24 December 1957 and was later allowed by the CAA to resume operation on 4 February 1958 after the compliance of PAL with the aforementioned recommendation.

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