

No. 18

Transportes Aéreos Mexicanos, S.A., Consolidated Vultee B-24J, XA-KUN,  
crashed at Mérida, Yucatán on 15 April 1957. Report released by the  
Ministry of Communications and Public Works, Mexico.

Circumstances

XA-KUN departed from Mérida Airport, Yucatán at 0753 hours local time on a scheduled cargo flight non-stop to Mexico City, D.F. Following take-off and when 1 200 metres from the end of the runway and 100 metres off the ground, the aircraft made a 65° left turn. It continued to rise and when 150 to 200 metres up, started another turn, also to the left. In so doing, however, it yawed to the left, then fell nose down at an angle of 70 to 80°. The three crew aboard were killed and a child on the ground was burned to death in the accident which destroyed the aircraft completely.

Investigation and Evidence

On the morning of 15 April 6 444 kg of cargo were placed aboard the aircraft. The pilot requested 1 200 gallons of fuel (3 270 kg) and 18 gallons of oil per engine (total 245 kg). The combined weight of the crew was estimated at 231 kg. The aircraft took off with a total weight of 10 190 kg aboard. Its authorized take-off weight was 10 700 kg. This left a safety margin of 510 kg.

The TAMSA technical adviser explained that cargo is loaded in two sections: nose section for miscellaneous and main cabin section, which, by its structure, accommodates packaged cargo. This is secured to the floor by means of ropes passing over the top of the load, so that no shifting occurs, whatever the manoeuvres of the aircraft which remains balanced. In the subject aircraft this space was occupied almost entirely by sea food products in closed boxes. In the tail

section and on the floor of the aircraft was a small amount of miscellaneous cargo, also held in place by ropes, completing the correct balance.

The inspector of air services, Mérida, stated that the load was redistributed at the pilot's request as the aircraft was too heavy - the tail shock-absorber was too close to the ground.

The aircraft had been grounded for five days by lack of fuel. The only item on the repair sheet was failure of the locking mechanism of the undercarriage to lock correctly in the up position. The day before the flight, as the aircraft had been grounded, the engines were given a check run with satisfactory results. The chief of maintenance further checked the engines and airframe before the flight, found no defects and made no repairs.

Conclusions of the Commission

XA-KUN was operating under a valid certificate of airworthiness and was in normal mechanical condition at the time of the accident.

The weight of the aircraft was within limits. It was noted, however, that bracing and tying of the load was far from satisfactory. In cargo aircraft generally, the load is not so fixed as to avoid shifting due to sudden manoeuvres.

Aside from the structural divisions of the Vultee aircraft, TAMSA have no permanent or movable fixtures to which strong ropes could be affixed to hold the cargo in place. Thus, while at the time of loading the balance may be correct, as in the case

of the subject aircraft, manoeuvres may create dangerous conditions by causing the load to shift.

The fact that the load was very near the authorized limit may have contributed to the impossibility of pulling out of an unco-ordinated turn, because of the shifting load.

Testimony of eyewitnesses, though varying as to distance and altitude estimates, agreed in the essentials as to the manoeuvre.

It can be stated that XA-KUN took off after receiving ATC clearance in normal mechanical conditions and good weather. It rose rather short but continued to climb correctly. The normal procedure, which is to climb to at least 2 000 metres in the direction of runway 10-28 before turning 180° onto the Mexico City heading, was not followed. According to the reconstruction of the flight on file, when the aircraft reached a point about 1 200 metres from the end of the runway and a height of about 350 feet, it made a 65° turn approximately, continued its flight in a straight line, gaining altitude, though observed to be tail-heavy, and when at about 600 feet went into a left turn. During this manoeuvre it slipped to the left and fell nose-down entering the ground at an angle of 70 to 80°.

It is obvious that the crew, in haste to get onto the Mexico City heading, started the turn without sufficient altitude. To correct this, they continued their flight in a straight line for some 2 200 metres further and again precipitately and in improper conditions, since neither altitude nor speed was sufficient, started another

turn onto the final heading. It was the opinion of the Commission that at this exact time, as the first turn had been made in improper conditions, part of the load must have shifted, towards the inside of the turn, and that this sudden shift, unforeseen by the crew, added to the low altitude and speed of the aircraft, caused the latter to fall before the manoeuvre could be corrected.

#### Probable Cause

The accident was due to a manoeuvring error which consisted in making two turns onto the Mexico City heading without conforming to the distance and procedure specifications and below the prescribed altitudes and speeds.

This error was aggravated by a probable shifting of the load due to improper securing.

#### Recommendations

It was recommended -

- a) that proper sanctions be applied to TAMSA for irregular assignment of flight personnel and lack of precise and rigid standards in distribution of flight time, and for absence of standards of discipline for such personnel;
- b) that proper sanctions be applied to TAMSA for improper securing of the loads carried;
- c) that the competent Bureaux be instructed to cause this airline to supply the necessary technical elements to ensure proper securing of loads.