No. 19

Empresa Consolidada Cubana de Aviación, Antonov AN-12A, CU-T 827, accident at Texcoco near Mexico City International Airport, on 9 February 1967. Report File No. 0023/1-87, dated 21 February 1967, released by the Aircraft Accident Investigation and Inquiry Commission, Directorate General of Civil Aeronautics, Mexico, on 3 March 1967

1.- Investigation

1.1 History of the flight

The aircraft was carrying out a non-scheduled international cargo flight from Rancho Boyeros Airport, Havana, Cuba, to Mexico City International Airport, Mexico. It departed Rancho Boyeros Airport at approximately 0100 hours Mexico time and its estimated time of arrival at Mexico was 0450 hours. At 0400 hours, when reaching the BX intersection, the aircraft contacted the Mexico Control Centre and requested authorization to enter the control area. This was granted and the latest weather information for Mexico Airport was transmitted to the aircraft but no acknowledgement was received. Subsequent transmissions from the aircraft on 118.7 MHz were unintelligible and it was instructed to change to 120.1 MHz. The clearance and weather information were again passed to the aircraft on that frequency. The aircraft reported over Nautla and Tulanciago and was informed that visibility at Mexico City was $1\frac{1}{2}$ miles because of fog. It was then instructed to descend from 18 000 to 12 000 ft and change to approach frequency 119.7 MHz. It was also advised that the runway would be 23L and that the wind was calm. At 0458 hours the aircraft reported over Tepexpan and was instructed to descend to 11 000 ft and report over the VOR where it could initiate a standard descent. At 0500 hours the aircraft reported over the VOR leaving 11 000 ft and was instructed to change to 118.1 MHz, the control tower frequency. This was the last contact with the aircraft. It did not establish contact on the tower frequency. At 0558 hours another flight informed the tower that there was a fire to the northeast of the airport. The accident occurred at approximately 0516 hours.

1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	4	6*	
Non-fatal			
None			

* Six mechanics of Empresa Consolidada Cubana de Aviación.

1.3 Damage to aircraft

The aircraft was destroyed.

1.4 Other damage

There was no other damage.

1.5 Crew information

The pilot-in-command held an airline transport pilot's licence valid until 16 March 1967 with type ratings for the Antonov 12-A, C-46, Ilyushin 18 and DC-4 aircraft for daylight, night-time and instrument flight: his most recent half-yearly training and check was in September 1966. He had flown a total of 10 830 hours including 701 hours on the Antonov 12-A. He had previously made three flights to Mexico City as pilot-in-command in the same aircraft and had had four days off duty before this last flight.

The co-pilot held an airline transport pilot's licence valid until 26 February 1967 with type ratings for the Ilyushin 18 and Britannia aircraft for daylight, night-time and instrument flight. He was also the holder of a senior commercial pilot licence and had flown a total of 15 240 hours including 153 hours on the Antonov 12-A. He had previously made 102 flights to Mexico City in different types of aircraft, including three in AN-12A aircraft. He had had five days off duty before this last flight.

The flight engineer held a flight engineer's licence valid until 28 July 1967 with type rating for the Antonov 12-A.

The fourth flight crew member shown on the crew manifest as navigator was in fact acting only as radar operator for the flight.

1.6 Aircraft information

The aircraft had a valid certificate of airworthiness and the operating times of the airframe, engines and propellers were within authorized limits. It had flown a total of 993 hours including 10 hours since the latest 100 hour inspection and had been operating normally up to the time of the accident.

Gross weight of the aircraft at take-off was 57 640 kg including 16 500 kg of fuel, and its centre of gravity was at 26 per cent MAC.

At the time of the accident approximately 7 680 kg of fuel remained and the gross weight of the aircraft was approximately 48 660 kg. Its maximum licensed take-off weight was 61 000 kg and the maximum landing weight was 54 000 kg.

The type of fuel being used was not stated in the report.

1.7 Meteorological information

Weather data passed to the aircraft shortly after 0400 hours was as follows:

partly covered, visibility 8 miles, temperature 4°C, dew point 3°C, wind calm, pressure 30.33 in. Hg.

The 0500 hours weather report at Mexico City International Airport was as follows:

partly covered, visibility reduced to 4 miles by low fog and mist, temperature 3°C, dew point 1°C, wind calm, pressure 1026.1 mb.

At 0505 hours visibility dropped to 2 miles and by 0515 hours to one-fifth of a mile, but occasionally increasing to 8 miles.

1.8 Aids to navigation

Not mentioned in the report.

1.9 Communications

Except for some difficulties on 118.7 MHz, communications with the aircraft were normal until 0500 hours when the last communication from the aircraft was received on 120.1 MHz.

Although the aircraft had then been instructed to change to 118.1 MHz, the control tower frequency, no communication was received from the aircraft on that frequency or any other frequency, during the subsequent 16 minutes to the time of the accident.

1.10 Aerodrome and ground facilities

Not mentioned in the report.

1.11 Flight recorders

Not mentioned in the report.

1.12 Wreckage

The aircraft struck some ploughed land at an elevation of 7 340 ft (the same elevation as the airport) about 18 km from the end of runway 23L, some 400 m to the right of the runway centre line, and its wreckage was scattered over an area 385 m long and 100 m wide, oriented in a general direction of 270°.

Examination at the site of the accident revealed that the aircraft struck the ground nose first, in an almost 24° nose down attitude, and with a bank to the left of approximately 25°. Following initial impact the aircraft rolled violently to the right and started to break up. After striking the ground twice the tail unit fractured and broke away from the fuselage. The rest of the fuselage together with the right wing, part of the left wing, the four engines and the No. 2 propeller continued moving forward and struck the bank of a ditch running north-south. Number 1, 3 and 4 engines then broke off and came to rest at the bottom of the ditch, the fuselage somersaulted violently across to the further side of the ditch, the right wing was torn off from the fuselage mid-section and projected, almost intact, some 100 m to the left, the cockpit broke up completely and finally engine No. 2 broke away and came to rest on the other side of the ditch.

Detailed examination of the wreckage revealed that at the time of impact the landing gear was retracted and locked, the flaps were extended to the 15° position and the landing lights retracted. One of the two pilot-in-command's altimeters was found at a setting of 1025 mb and indicating 11 000 ft and one of the two co-pilot's altimeters was found at a setting of 764 mm Hg and indicating 2 300 m. (Each pilot had two altimeters, one calibrated in feet, the other in metres.) The sound alarm on the radio altimeter was found in the "not selected" position.

Evidence revealed that the four turboprop engines were developing power at impact with their propeller at a pitch angle of approximately 25°.

No evidence was found of any structural failure, fire or explosion prior to impact.

1.13 Fire

Fire broke out following impact. It started when the left wing broke and fuel came in contact with the exhaust of No. 1 and No. 2 engines.

1.14 Survival aspects

This was a non-survivable accident.

1.15 Tests and research

A test flight was flown with one of the Britannias of Compañía Cubana de Aviación carrying as observers three members of the Aircraft Accident Investigation Commission and three members of the Cuban Department of Air Safety to determine what approach procedure had been flown by the aircraft.

First a normal instrument approach procedure, as prescribed in the Aeronautical Information Manual, was carried out. Then a race course type of approach procedure, i.e. fix over the VOR followed by a left-hand turn to intercept Tepexpan south beam was made. Finally another race course type of approach procedure was executed, extending the outbound leg beyond the intersection of Tepexpan south beam and turning beyond Texcoco, thus following the assumed path of the subject aircraft. It was found that in the latter case the aircraft flew near the site of the accident on a course parallel to the wreckage trail when a turn became necessary to intercept the 048° VOR radial.

2.- Analysis and Conclusions

2.1 Analysis

According to the AIP Manual, the normal instrument approach to Mexico City International Airport consists of flying over the VOR at a fixed height (indicated in advance by the approach controller or in accordance with established procedure); when over the VOR the descent is initiated and when the south beam of the Tepexpan radio range (QDM 10° of Tepexpan) is intercepted a procedure turn on to the runway axis is carried out.

Apparently the crew of the subject flight did not follow the normal approach procedure. After having flown over Mexico City VOR they initiated a left turn to make a race course type approach and started descending. The outbound leg was extended beyond the village of Texcoco, and a left turn was then initiated to intercept the 048° VOR radial. However, it appears that the aircraft crossed over this radial, continued turning and descending to intercept the radial again and struck the ground in a left bank attitude. This appeared to be confirmed by marks on the ground which indicated that initial impact occurred while the aircraft was at a 240° magnetic heading and by a test flight which indicated that by flying such a pattern the test aircraft flew near the accident site on a course parallel to the wreckage trail when a turn became necessary to intercept the 048° VOR radial.

2.2 Conclusions

(a) Findings

The crew were properly certificated.

The aircraft was airworthy and its engines were operating normally up to the moment of the accident.

The aircraft struck the ground nose first in an almost 24° nose down attitude and with a left bank of approximately 25°.

No evidence of fire or explosion prior to impact was found.

Fire occurred when the left wing broke and fuel came in contact with the exhaust of No. 1 and No. 2 engines.

There was no evidence of the aircraft being out of control during the procedure turn and descent.

The aircraft was not in the landing configuration.

Communications between the aircraft and the Control Centre were normal up to fixing on the Mexico City VOR.

The aircraft never contacted the control Tower on the frequency indicated (118.1 MHz).

Although the weather conditions were not good at the time of the accident, the crew apparently discontinued instrument flight and tried to make a visual approach.

The aircraft did not follow the procedure established for instrument descent at Mexico City International Airport and at the moment of impact it was effecting an approach descent and attempting to intercept QDM 228° for final approach to runway 23 left.

(b) Cause or
Probable cause(s)

The probable cause of the accident was pilot error in that -

(1) he executed an IFR descent procedure other than that which was established for Mexico City International Airport; and

(2) he discontinued IFR flight during the descent outside the area protected for VFR flight at that time of day and in the reported weather conditions, below the absolute minima established for descent.

3.- Recommendations

The following recommendations were made following this accident:

1. That all aircraft of national or foreign registry operating into Mexico City International Airport and domestic airports comply with approach procedures and minima established by the Directorate General of Civil Aviation in the Aeronautical Information Publication Manual;

2. That all foreign and national airlines and operators instruct their pilots not to discontinue IFR flight when weather conditions are below the minima established for VFR flight;

3. That all domestic airlines revise the procedures specified in the check lists for indicating or clearly defining the responsibilities of each crew member during the different phases of flight;

4. Discontinuance of instrument flight outside the control zone should not be permitted.

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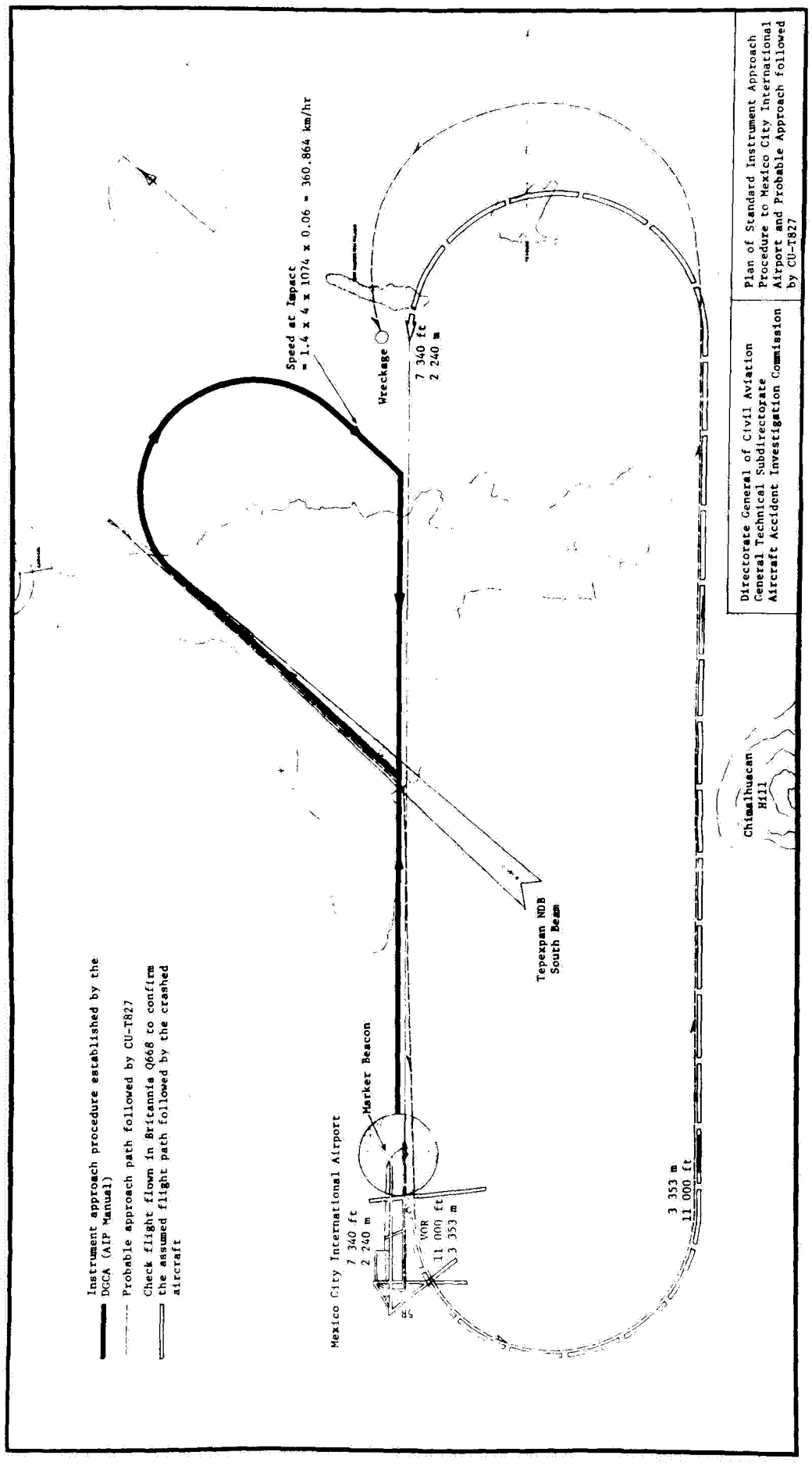

Figure 19-1. Accident to Antonov 12A, CU-T827 of Empresa Consolidada Cubana de Aviación near Mexico City International Airport on 9 February 1967