No. 4

Trans-Mediterranean Airways, Avro York 685 Freighter, OD-ACZ, accident 16 miles west of Mehrabad Airport, Tehran on 15 March 1963, Accident Report dated 20 July 1963 released by the Director General of Civil Aviation, Iran.

1. Investigation

1.1 History of the flight

On 14 March 1963 the aircraft carried out a non-scheduled, international freight flight Beirut/Kuwait/Tehran. Several test manoeuvres were carried out on the Kuwait/Tehran section of this flight because the aircraft carried a check pilot who was examining the pilot-in-command and the co-pilot for renewal of their licences. The flight arrived at Mehrabad Airport, Tehran, at 1740 hours GMT and the pilot-in-command decided to make an overnight stop there, for the purpose of crew rest. The aircraft was unloaded immediately and then loaded with freight for the return flight, in accordance with the pilot-in-command's instructions. On the morning of 15 March, a fully routine preparation for the return flight to Beirut was made. The pilot-in-command inspected the load and certified that he was satisfied with the load distribution and trim sheets. The flight took off normally at 0530 hours GMT with the pilot-in-command in the left-hand seat. Just after take-off the Air traffic controller instructed the flight to switch over to Approach Control on 119.7 Mc/s and to report when 25 miles out from Mehrabad. This was acknowledged by the flight. However, as the flight failed to report when 25 miles out on course as requested, continuous and unsuccessful attempts, commencing at 0540, were made by the controller to establish radio contact. At 0545 smoke rising to the west of the airport was observed from the Control Tower and another aircraft on local flight confirmed that a crash had occurred. The Airport Fire Service proceeded to the reported location, 16 miles on a heading 280° west of the airport and discovered the burning wreckage of the aircraft. The accident occurred at about 0540.

1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	4		
Non fatal			
None			

1.3 Damage to aircraft

The aircraft was completely destroyed.

1.4 Other damage

No other damage was reported.

1.5 Crew information

The crew consisted of the pilot-in-command, co-pilot, check pilot and radio officer.

The pilot-in-command, age 55, held a Lebanese airline transport pilot's licence which was valid but due to be renewed in four days. He had ratings on DC-4 and York 685 aircraft. At the time of the accident he had 16 553 hours flying experience, of which over 6 000 had been in York 685 aircraft and 59 of these were in the 90 days prior to the accident.

The co-pilot, age 28, held a Lebanese commercial pilot's licence with rating on York 685 aircraft. This licence had expired the day previous to the accident. At the time of the accident he had flown 4 714 hours, over 4 000 of which were in York 685 aircraft. In the 90 days prior to the accident he had flown 175 hours in York 685 aircraft.

Both the pilot-in-command and the co-pilot had their latest instrument and medical checks in September 1962.

The third pilot on board, age 34, was a check pilot who was checking the performance of the pilot-in-command and the co-pilot for the renewal of their licences. He held a valid Lebanese airline transport pilot's licence, had ratings on Douglas DC-3 and DC-4 and had completed 11 899 hours of flight.

The fourth crew member was a radio officer, age 29, who had 4 294 hours of flight experience.

1.6 Aircraft information

The aircraft held a certificate of airworthiness valid until 16 November 1963 and also a certificate of maintenance which had been issued two days prior to the accident. The maintenance of the aircraft had been properly carried out in accordance with the York Aircraft Maintenance Schedule approved by the Aviation Safety Service, Directorate of Civil Aviation, Lebanon. The pilot-in-command had not reported any defect of the aircraft or made any request for technical attention to the aircraft during the transit stop at Mehrabad and nothing abnormal was noted on the aircraft at any time.

The weight at take-off, 30 309 kg, was below the maximum permitted. Although some computation errors were noted in the load distribution and trim sheet, the actual centre of gravity on this flight was well within the prescribed limits.

The type of fuel being used on the flight was not specified in the report.

1.7 Meteorological information

Weather conditions in the area of the airport and crash site at the time of the accident were as follows:

Ceiling:	Unlimited
Visibility:	20 km
Wind speed:	5 kt
Wind direction:	120°
Temperature:	14°C
Dew point:	-7°C
Turbulence:	Negligible

1.8 Aids to navigation

Not mentioned in the report.

1.9 Communications

Normal communication took place between the aircraft and Mehrabad Control Tower. No call was made to denote any abnormal or emergency flight condition.

1.10 Aerodrome and ground facilities

Aerodrome and ground facilities were adequate.

1.11 Flight recorders

No flight recorder was mentioned in the report.

1.12 Wreckage

The wreckage was dispersed over flat, open terrain within an area 505 ft in length and extending progressively from a sharp furrow in the loose gravel at the point of initial ground contact to a maximum width of approximately 140 ft. Examination of the furrow and of the torn-off starboard wing tip showed that the aircraft was in a decidedly steep starboard-wing-down attitude at the moment of impact. Between 180 and 200 ft after the point of initial ground contact the condition of the ground surface and the heavy concentration of debris gave positive evidence that the aircraft hit the ground in a steep nose-down, starboard-wing-down attitude. The impact force caused the aircraft to completely disintegrate and wreckage and freight were widely scattered over the area beyond. A study of the wreckage and subsequent search in the area indicated that no major structure had broken and dropped from the aircraft prior to the accident.

1.13 Fire

Widespread fire consumed or melted much of the wreckage because of the spillage of fuel and oil and the inflammable nature of the freight. As soon as the Control Tower at Mehrabad reported smoke rising to the west of the airport, the Airport Fire Service proceeded to the reported location; however, because of the inaccessibility of the crash site and its distance from the airport (16 miles) the wreckage was extensively burnt before any fire-fighting action could be taken.

1.14 Survival aspects

Survival aspects were not mentioned in the report.

1.15 Tests and research

The engines and their propellers were brought to Mehrabad for detailed examination. Examination of the propellers revealed that the engines were not under power at the time of the accident and that No. 1 propeller failed in full fine pitch (25°), No. 2 in almost full fine pitch (28°), No. 3 in a fully feathered position (91°) and No. 4 at 56°, i.e. between full coarse pitch 50° and fully feathered.

Examination of the engines did not reveal any probable malfunction of the engines prior to the accident. However, since doubts existed on No. 2 engine and what was believed to be its supercharger Nos. 2, 3, and 4 engines together with wheel case assemblies as salvageable and the above referenced supercharger were sent to Rolls-Royce Limited, Glasgow, Scotland. Rolls-Royce issued defect investigation reports stating that the doubtful supercharger belonged in fact to No. 1 engine and that investigation had not revealed any mechanical failure within the engines except as a consequence of impact and fire damage.

2. Analysis and conclusions

2.1 Analysis

The pre-flight preparation, taxiing and take-off were normal. The aircraft took off from runway 29 under excellent weather conditions. There is substantial evidence that No. 4 propeller was feathered soon after take-off and that the aircraft continued to maintain its approximate take-off course at an altitude estimated to be around 250 ft over flat and open terrain possessing the same elevation as the airport - terrain suitable for controllable forced landing with a minimum of hazards.

Examination of the aircraft indicated that the undercarriage and the flaps were fully retracted at the time of impact and that the elevator trim was in a fully down position. No evidence of pre-crash defects or failure were found in the aircraft or its elevator and rudder control systems.

Examination of the engines and their propellers revealed that they were not under power at the time of the accident and that No. 3 propeller was in a fully feathered position and No. 4 propeller at 56°, i.e. between full coarse and fully feathered. No evidence of any pre-crash mechanical failure within the engines was found.

The facts that on 14 March, prior to landing at Kuwait and again at Tehran, certain check flight exercises were carried out and that during the fatal flight no abnormal flying conditions were reported by the aircraft to Mehrabad suggest that No. 4 propeller was intentionally feathered soon after take-off for simulating an engine failure condition at take-off, in the course of a crew checking exercise.

The fact that technical investigation established that at impact No. 3 propeller was fully feathered and No. 4 at a pitch between fully feathered and full coarse pitch suggested that during this exercise an emergency condition developed which necessitated the feathering of No. 3 propeller and the subsequent unfeathering of No. 4 propeller.

2.2 Conclusions

Findings

There were three pilots in the crew; the pilot-in-command who had a valid licence which was due to be renewed in four days, the co-pilot whose licence had expired the day previous to the accident and a check pilot who had a valid licence and who was testing the other two pilots for renewal of their licences.

The aircraft had a valid certificate of airworthiness and had been properly maintained.

The weight of the aircraft at take-off was below the maximum permitted and the centre of gravity was within the prescribed limits.

The weather conditions at the time of the accident were excellent.

No positive evidences of a pre-crash mechanical defect, or failure that could have adversely affected the safe flight conditions of the aircraft were found.

There was evidence that No. 4 propeller was feathered soon after take-off, presumably to provide a simulated engine failure condition in the course of a crew checking exercise. However, the positive findings from technical examination are that at the time of impact the No. 3 propeller was in a fully feathered position and No. 4 propeller was in a position between the full coarse and feathered positions.

Cause or Probable cause(s)

The position of the propellers at the time of impact would indicate that, at a time when the No. 4 engine power was off, an emergency condition developed which necessitated the feathering of No. 3 engine and the unfeathering of No. 4. Alternatively, a loss of power on the starboard engines could have occurred from an erroneous manipulation of the feathering switches during the course of this assumed crew checking exercise.

In view of the fact that the fully loaded aircraft was flying at a low altitude after taking off from Mehrabad Airport which has an elevation of 3 900 ft, it is evident that the aircraft would not have had sufficient altitude for the pilot to take effective recovery action and so avoid a crash resulting from the above mentioned loss-of-power conditions.

3. Recommendations

Meticulous attention should be given to the compilation of Load Distribution and Trim Sheets and pre-departure details, such duties should be done or be supervised by a fully trained and qualified Supervisor.

A responsible Operator's Supervisor should be in attendance whenever an aircraft departs and must be readily available and remain on airport stand-by duty for a reasonable period after the operator's aircraft has departed.

It is suggested that pilots should be discouraged from carrying out any abnormal operating procedures from a high altitude runway during a commercial operation. Crew check duties should preferably be conducted at the Operator's Base.

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