No. 7

British European Airways Corporation, Viscount, G-AOJA, crashed at Nutts Corner, Belfast, Northern Ireland, on 23 October 1957. Report released by the Ministry of Transport and Civil Aviation (UK). C. A. P. 150.

Circumstances

The aircraft departed London Airport at 1516 hours GMT on a flight to Belfast in pursuance of a special charter, carrying 5 crew and 2 passengers. At 1645 the aircraft was taken over by the Precision Approach Controller for a GCA talkdown on runway 28 (276°) in weather conditions which the captain thought would allow him to become visual at or above his critical height of 500 ft. Soon after "3/4 of a mile from touchdown" the aircraft was to the right of the centreline and shortly afterwards was "well right of centreline". Just after "1/2 a mile from touchdown" the Precision Approach Controller said "if you're overshooting turn left left 5° on overshoot over" to which the reply came "... overshooting". At about this time a number of witnesses heard the aircraft "rev-up". Shortly thereafter (at 1651 hours) the aircraft crashed within the boundary of the airport approximately 1 000 ft to the south of the western end of runway 28, killing all occupants.

Investigation and Evidence

Crew Information

In all, the captain had flown a total of 7 496 hours of which 316 were on Viscount 802 aircraft. In the last six months before the accident he had flown 301 hours and had landed at Nutts Corner on twelve occasions.

The first officer had flown a total of 4 739 hours of which 259 hours were on Viscount 802 aircraft. In the last six months he had flown 280 hours.

The Weather

A cold front was expected to clear through the Belfast area between 1600 and 1800 hours. Cloud at Nutts Corner was forecast to be down to 300 ft but improving after 1600 hours. The captain in conversation with Air Traffic Control discussed the possibility of diverting to Dublin or Aldergrove. After being informed that aircraft had reported a cloud base of 500 - 600 ft the captain decided to continue the flight to Nutts Corner. Four ground witnesses who were in the approach area at the time of the accident reported fog on the surface and gave varying estimates of the visibility. Although the aircraft crashed within the airfield boundary nobody saw the crash.

The Wreckage

As a result of the crash there was a far-reaching disintegration of the structure of the aircraft.

At the moment of impact all three undercarriage units were fully retracted and locked. On this type of aircraft it takes about 13 seconds from pressing of the selector button for the undercarriage to reach the fully locked position. The Court had no reason to doubt that when the aircraft was approaching the eastern end of the runway the landing wheels were down and concluded that they must have been selected up at the moment the decision to overshoot was taken. It was impossible to conclude that undercarriage drag had any significant effect on airspeed at any material time.

It was ascertained that the flaps were near to the fully up position at the time of impact.

Other reliable evidence suggested that the captain would have selected 85% (40°) flap upon identifying the approach lights which the Court considered he was able to do and almost certainly did.

A study of the ground at the place of impact suggests that the port wing had struck the ground a little before the starboard wing but not appreciably so. There were positive indications that the aircraft was not inverted.

It was concluded that the heading of the aircraft was 204° or 72° to the left of the line of runway 28.

The sixteen propeller blades had all been torn from the hubs and the indications were that they were all rotating under similar conditions at the time of impact. They had been at a pitch setting within the normal constant speeding range.

The engines were badly smashed up but enough could be observed upon examination to confirm that they had been rotating at the time of impact, and there was no indication of any failure or fire in any one of them.

The more delicate instruments in the aircraft were so badly destroyed that beyond saying that the gyros of the twin compass system were rotating at the time of the impact those who examined what was left were unable to point to any useful conclusions.

Although it is not, and was not claimed by any witness to be, conclusive the best evidence based on examination of the wreckage is that none of the controls were jammed before the impact.

Discussion

The experience of an officer who knew the captain well and had often flown with him as a co-pilot was that the captain was accustomed to fly his aircraft manually after take-off until he reached an altitude of 4 000 - 5 000 ft. When approaching his destination he used to disengage the auto pilot from the time he entered the aerodrome control area and fly manually until he had landed the aircraft. According to the same witness the captain's usual practice was to leave the clutches engaged with the auto pilot selected out.

The captain was familiar with and favoured the monitored approach procedure which BEA recommends. Whether he or his first officer did the flying or the visual looking out was a matter for his own decision in the circumstances of any individual let-down. He was regarded as a meticulous watcher of his approach speed.

The Court was satisfied that during the whole of the period of the talkdown eleven out of thirteen of the red low intensity approach lights, the red obstruction lights, the green low intensity threshold lights and all save one of the white directional runway lights were alight.

The Court was satisfied that the captain was at no time in breach of the provisions of the Air Navigation Order 1954 relating to Aerodrome Meteorological Minima for aircraft registered in the United Kingdom and that he complied with the instructions issued from time to time by BEA which cover every aspect of approach and landing in limited visibility.

In all the circumstances the Court could not favour any explanation of the accident based upon pilot error. The elimination of pilot error resulted in concentrated study of other factors such as malfunctioning of the control mechanism which might make the aircraft uncontrollable. In this connection, the possibility of something jamming the controls was given detailed consideration.

BEA have a standing order the intention of which is to eliminate any possibility of loose objects being left about in the cockpits of aircraft. Provision is also made requiring those who are responsible for carrying out the various prescribed "checks" to satisfy themselves that no tools or similar objects are left behind when panels are closed or in any other section of an aircraft in which work was required in the course of the "check".

So far as the Viscount 802 is concerned, the only one of the controls into which a foreign object could find its way was the aileron servo motor on the port pilot's platform. After going through the complete control system a reliable witness from the Service Branch of the builders of Viscount aircraft was unable to find any other place into which any but insignificant foreign objects might get.

More than a month before the accident the builders put out a bulletin recommending the covering of an aperture through which objects might fall into the control mechanism governing the ailerons. The modification was given the value "desirable". A large number of "desirable" modifications are suggested from time to time and these are studied and applied as and when convenient.

There is not in this case a shred of evidence which would justify a finding that any interference with the controls had anything to do with the fatality. Two circumstances only have made it necessary for the topic to be discussed. The first of these is the elimination of any probability of pilot error. The second is the wide canvassing of the possible significance of the finding among the wreckage of the aircraft of a small screwdriver, of the type commonly used by electricians, in a badly distorted condition which indicated that it had been subjected to severe stresses.

While it was clearly possible for a foreign object like this screwdriver to have fallen through the aperture into the aileron controls the Court felt bound to accept the evidence of the scientific investigators that it was not probable that this screwdriver was jammed in the aileron controls on the occasion of this crash.

A detailed examination of the auto pilot equipment salvaged from the aircraft was carried out. There was nothing wrong with the auto pilot and it was not energized nor were the clutches engaged at the time of impact.

Careful work was done in the course of a study by an expert to try to establish the flight path followed during the final dive and particular attention was paid to the possibility of a bunt manoeuvre or of a partial recovery from a stall.

It appears possible to obtain conditions at impact similar to those reported without requiring any structural failure or unserviceability of the aircraft but also that the manoeuvre required would be of a fairly violent nature.

Something may have deceived the pilot into some violent manoeuvre of the kind envisaged. It would seem that the only possible source of such deception would be the Flight System and associated instruments.

All that was recovered from the wreckage was subjected to an exhaustive examination by an impressive body of experts and they failed to find anything which pointed to the malfunctioning of any instrument or indicator which could have led the pilot into a disastrous operation of the controls.

Probable Cause

The cause of the accident was not determined.

Recommendations

Consideration should be given to the disciplinary aspect of the switching on and off of aerodrome lighting. In this case

there was a conflict of evidence between local residents and the airport staff as to whether the approach lights were on when the aircraft was coming in to land. The Court favoured the evidence given by the officials but not without some misgiving. It must help the man who is responsible for seeing that lights are switched on or off as is appropriate to the weather conditions prevailing if he knows that as a matter of drill he must make some record of the times at which he performs these duties. It is not for the Court to suggest the method by which or the form in which such records should be made but it is reasonably assured that some such drill could be insisted upon without putting any appreciable burden upon the personnel concerned.

The bent screwdriver was handed to the Investigating Officer of the Accidents Investigation Branch on the second or third day after the wreckage had been taken into a hangar for examination. The Investigating Officer put it aside in a box along with some other small components which were awaiting more detailed examination and when several days later he went to find it, it had gone. He found that the screwdriver had been picked up by a person employed at the airport, straightened by him and presumably used again as a screwdriver, no doubt in all innocence and good faith.

In this case the screwdriver was not taken and tampered with by an ordinary member of the public to whom the police could deny access to the hangar but, as has been said, by one of the persons detailed to assist in the moving of the wreckage and as such authorized to be in the hangar and so to have access to the impounded objects.

Again it is not for the Court to devise security methods designed to prevent this sort of thing happening again but it expresses the strong view that somebody ought to.

It is clear that the possibility of loose objects finding their way into the control mechanisms of aircraft and jamming them is in the mind of all concerned with the design, operation and flying of aircraft.

The Court takes this opportunity of calling for constant vigilance in this respect and for the devising of drills and disciplinary sanctions directed to the elimination so far as may be possible of carelessness which may lead to the leaving of tools or other objects loose in an aircraft in such a way as to create any possibility of the sort of mischief which has had to be considered in the course of this investigation.

- - - - - - - - - - - - - - -

Non-scheduled
Landing
Undetermined

ICAO Ref: AR/546