

No. 2

Surrey Flying Services Ltd., York AVRO aircraft crashed near R. A. F. Airfield, Lyneham, on 27 November 1952. Ministry of Civil Aviation Report MCAP 115

Circumstances

The accident occurred towards the end of a positioning flight from Stansted to Lyneham prior to an intended flight with freight from Lyneham to Singapore.

Before departing from Stansted the captain telephoned the Meteorological Office at Lyneham and obtained the local weather situation. The en route flight to Lyneham was without incident and on arrival overhead a Ground Controlled Approach to Runway 07 was begun. The aircraft intercepted the glide path at 2,000 ft. and a normal talk-down approach was made until the 1/4 mile from touch-down position was reached. During the approach a normal descent was maintained with variations of up to 50 ft. above the glide path. At the 1/4 mile from touch-down position the aircraft's echo disappeared from the Tracker's Radar screen in a downward direction indicating a high rate of descent. At this time the captain, who was concentrating on the flight instruments, was warned suddenly by the co-pilot that there were trees ahead. The captain immediately pulled back the control column but was unable to prevent the aircraft striking the upper branches of trees and the ridge of steeply sloping ground approximately 140 yds. short of the touch-down point. The aircraft was severely damaged and three of the crew were slightly injured. There was no fire.

Investigation and Evidence

Prior to departure from Stansted, the captain telephoned at 0750 hours direct to the Lyneham Meteorological Office and was given the following meteorological conditions at Lyneham:-

"Now 500 yards visibility and sky obscured. By 1100 hours an improvement to 1000 yds. and 8/8 St at 700 ft. is expected."

At the time of departure from Stansted the actual weather was:-

"Overcast, mist. Continues slight drizzle. Visibility 1,400 - 1,500 yds. 8/8 St base 200 ft."

A flight plan was filed for Lyneham via Brookmans Park, Watford, Burnham and Compton at 5000 ft. under Instrument Flight Rules. The estimated elapsed time was 32 minutes with 3 hours 30 minutes endurance. Stansted and London Airport were given as alternatives.

The aircraft took off from Stansted at 0832 hours and proceeded according to Flight Plan. At 0900 hours the aircraft passed the Compton Fan Marker at 5000 ft. and was cleared by London Airways to descend to 3000 ft. on a QNH of 987 millibars. On passing through 4000 ft., clearance was given to change to Lyneham frequency 116.1 Mc/s. The working on this frequency is not electrically recorded but from a number of manually monitored logs, all of which agree in substance, a close reconstruction of the communications can be obtained.

At 0904 hours Lyneham Flight Information Service passed the following weather:-

"Present weather. Fog. Visibility 600 yards. Sky not discernible. Surface wind 060° - 13 knots."

This was acknowledged by the aircraft and a Ground Controlled Approach was requested.

The GCA Director took control on the same frequency, 116.1 Mc/s, and passed clearance to descend to 2000 ft., QNH 992 millibars, runway in use 07, touch-down height 510 ft. This was in accordance with normal RAF practice. The captain, however, requested QFE and was given QFE 975 millibars. This was set on the pilot's altimeters which were cross checked and showed no discrepancy. A warning was passed and acknowledged, to exercise caution on final approach due to the approach lights being well below the level of the runway. The cockpit checks for landing were completed and the aircraft was directed into a position about 7 GCA miles from touch-down on the final approach to Runway 07. (1 GCA mile = 5000 ft.) At this point the GCA talk-down controller took over and passed to the aircraft an amended QFE of 976 millibars. This was read back from the aircraft and was duly set on both altimeters. The aircraft intercepted the glide path about 6 miles from touch-down and instructions were passed to it to descend at 500 ft. per minute. The aircraft established the descent with the undercarriage locked down, 40° of the flap lowered and an rpm setting of 2850. The flap and rpm settings then remained unaltered throughout the approach and the boost settings were adjusted as necessary between 0 and +2 psi. The indicated airspeed was between 120 and 125 knots.

The following is the substance of the instructions which were given by the Talk-Down Controller during the remainder of the approach:-

4 miles - 50 ft. too high, maintain 070°.

3 miles - Right 5° on to 570°, on the glide path.

2 miles - Left 5° on to 070° on the glide path, check wheels and flaps for landing, clear to land on this approach.

1 1/4 miles - Left 3°, nicely on the glide path.

1 mile - Right 3°.

3/4 mile - 3/4 mile from touch-down on the glide path.

1/2 mile - above glide path, 50 feet too high.

1/4 mile - Left 3°, clear to land talk-down out.

The captain stated that the last altitude he observed on his altimeter was 500 ft. and the last talk-down instruction that he remembers hearing was "3/4 mile - 50 ft. too high". He remained flying on instruments until he heard a shout from the first officer; when he looked up, saw trees ahead and pulled back on the control column. He never saw any approach light.

The first officer stated that the last altitude that he observed on the starboard altimeter was 300 ft. at about 3/4 mile from touch-down. He then looked ahead expecting the visibility to be 600 yards. In spite of the correct functioning of the windshield wipers, however, he was surprised that he could not see any approach lights. The last talk-down instruction that he remembered hearing at about this time was "50 ft. too high." He then saw trees ahead at an estimated range of 50 to 100 yds. and shouted a warning at the same time pulling back on the control column. The aircraft flew through the treetops which damaged the nose and shattered the windshield. It then struck the ridge of steeply sloping ground, bounced, skidded and came to a standstill. The crew, three of whom were slightly injured, left the aircraft through the broken starboard cockpit window and the astrodome.

The talk-down controller was following the aircraft's echo on an azimuth screen and passing instructions to the aircraft. His assistant, the GCA tracker, was tracking the aircraft in relation to the glide path. By means of a handwheel he fed any discrepancy from the glide path into an error meter on the talk-down controller's panel. In addition he called out the range of the aircraft from touch-down. The talk-down controller stated that throughout the whole approach the aircraft was never indicated as being below the glide path.

The tracker stated "at the range 1/4 mile from touch-down, the aircraft's echo descended rapidly and disappeared off my screen at a speed too fast to enable me to turn the handwheel to follow it."

Inspection at the scene of the accident showed that the approach to Runway 07 is over a valley with tree-covered ground rising steeply to a ridge which is about 130 yds. from the runway threshold. There are 15 sodium centre line approach lights, which were illuminated at the time of the accident; these are mounted on posts 30 ft. high at 100-yard intervals. They are situated in a clearing which is cut through the trees and in some case they are below tree-top level. With the exception of the last one, they are all below runway level.

The aircraft had first struck a tree situated about 15 yds. to the right of the extended runway centre line and 200 yds. from the runway threshold. This tree had been about 60 ft. high with the tree top about 10 ft. above the runway threshold level. The upper branches of the tree were broken off at about runway level. The aircraft then struck the ground on the top edge of the ridge which broke the undercarriage bouncing and skidding to a standstill 350 yards from the ridge facing the direction from which it had come. Pieces of the undercarriage and parts of cowlings lay along this 350-yd. line, but the aircraft remained substantially intact.

The theoretical touch-down point for Runway 07 is situated one GCA mile (5000 ft.) from the GCA van, and is approximately 10 yds. from the threshold of the runway. The angle of the GCA glide path is  $3^{\circ}$ . Under normal civil practice on a similar runway the touch down point would be situated approximately 220 yds. from the runway threshold; this would have the effect of increasing the glide path height by about 30 ft. The normal break off altitude (obstacle clearance limit) used at Lyneham for Runway 07 is 610 ft. (QNH) that is, 100 ft. above the touch-down point.

There was no mention of a warning to the pilot by GCA that he was approaching break off altitude. Furthermore both pilots stated that they did not receive any instructions regarding the break off altitude at any time during the approach. The talk-down controller was unable to give an assurance that he had passed a break off altitude warning during the talk-down.

#### Observations

1) No instrument approach charts for Lyneham were on board the aircraft at the time of the accident.

2) At Lyneham the visibility is observed over the airfield from the base of the control tower. There is a strong evidence that the actual visibility at the threshold to Runway 07 at the time of the accident was considerably less than the airfield visibility (500 yds) observed at 0915 hrs. The VHF/DF operator, who was in a vehicle 300 yds. from the touch-down point and was monitoring the talk-down, left the vehicle to look for the aircraft but failed to find it. He estimated the visibility to be 150 yds.

The two pilots have stated that immediately after escaping from the aircraft they estimated the visibility to be about 200 yds.

3) The QFE at Lyneham is calculated for a height of 457 ft. above sea level. The published airfield elevation is 513 ft. and the touch-down height for Runway 07 is 510 ft. A QFE so calculated would cause the pilot's altimeter to read 53 ft. at the touch-down point instead of 0 ft.

4) The ground formation close to the threshold of Runway 07 falls away rapidly and under certain conditions of wind is likely to cause a downdraught. It seems likely that on the flight considered in this report the aircraft was subjected to an increased rate of descent as a result of such a downdraught.

5) There was no clear pre-arrangement of the division of duties between the pilots during the approach. The co-pilot could have warned the captain when the aircraft was reaching critical altitude as indicated on the altimeters and thereafter assisted in the transition from instrument to visual conditions. Considering that no such pre-arrangement had been made, the captain did not pay due attention to his altimeter during the final stages of the approach.

6) The captain's knowledge of the weather situation was confined to the poor actual conditions at his proposed destination. The weather at his point of departure and first alternate was below his company's landing limits, and he had not obtained a forecast for his second alternate.

#### Discussion

The actual visibility during the approach was considerably less than the 600 yds. airfield visibility which had been reported to the aircraft. The operator's weather minima for this approach are 400 yds. visibility, 200 ft. cloud base. As the cloud base was on the surface the relevant minimum would have been 400 yds. actual visibility at a height of 200 ft.

The captain was, therefore, quite justified in attempting this approach on the information given to him; but as he did not have visual reference to the ground at an indicated altitude of 200 ft. he should have applied power and prepared to overshoot. If he had done this, even making maximum allowances for errors in altimeter reading and taking into consideration the effect of an increased rate of descent probably due to down draught, collision with the trees would have been avoided.

The apparent omission by the talk-down controller of the warning that the aircraft was approaching break-off altitude meant that the captain's attention was not drawn to his altimeter at a vital time. Also the fact that the controller continued the talk-down beyond this point undoubtedly gave the captain a false sense of security.

#### Conclusion

The accident occurred as a result of the captain's allowing the aircraft to descend below critical height during a Ground Controlled Approach without having visual reference to the ground.

The contributory causes were:

1) The captain was not warned by the talk-down controller that the aircraft was approaching break-off altitude.

2) The visibility at the threshold of Runway 07 was less than the airfield visibility which had been reported to the captain.

3) The aircraft was affected by a downdraught which caused it to sink below the glide path. The glide path at Lyneham allows for less obstacle clearance than is normal with a civil installation.