

No. 20

Eagle Aviation Limited, Viking, G-AJBO, crashed at Blackbushe Airport  
England, on 1 May 1957. CAP 146, released by the  
Ministry of Transport and Civil Aviation (UK).

Circumstances

The aircraft was on a trooping flight from Blackbushe Airport to Idris in Tripoli and was carrying a crew of four, one supernumerary crew as passenger and thirty passengers. A few seconds after 2114 GMT the aircraft was observed to make its run and to take off. At 2116, it called the control tower and passed the following message, "I have got a port engine failure I am making a left-hand circuit to come in again." Having completed the downwind and base legs of this circuit, the aircraft crashed in a wood just as, or just after, it had turned onto the final approach and at a distance of about 1 200 yards from the threshold of the runway. Thirty-four of the thirty-five persons on board lost their lives.

Investigation and Evidence

An investigating officer was able to establish that the aircraft struck the ground first with the port wing tip and then, having attained an inverted position, severed the top of a tree with the starboard wing, following which it doubtless lost both wings and swung round so that the fuselage came to rest pointing back in the direction from which it had come.

Within a very short time after the crash the petrol caught fire with resulting severe damage to the engines. The question of why the port engine failed, if it did, must therefore remain a matter of pure speculation - the evidence is quite insufficient to enable any conclusions to be drawn. It is always possible, for example, that the pilot's decision to regard the engine as having failed may have been due to the failure of some instrument, and not to the actual failure of the engine itself.

The aircraft had a valid Certificate of Airworthiness and a valid Certificate of Maintenance. It was properly loaded, trimmed and maintained at the time of the accident.

Handling of the aircraft following failure of the port engine

It seems likely that at the time the port engine was considered to have failed the aircraft had attained a height of between 500 and 700 feet. According to the performance schedule of this aircraft it should have been capable, with the load carried, of climbing on one engine at the rate of 155 feet per minute or, if that engine was run continuously at take-off power, at the rate of 250 - 300 feet per minute. According to the Operations Manual the ideal height when turning onto final approach should be 700 feet when landing on one engine and the speed should not be allowed to fall lower than 110 knots (109 being described as the minimum effective control speed) until the decision to land has been made.

The cardinal principle in making a landing with one engine inoperative is to avoid an undershoot, namely the position where the pilot after turning onto final approach finds himself with insufficient height and speed to reach the runway. The fact that one engine is inoperative renders the aircraft power asymmetric so that, if as in this case the port engine is dead, it tends to fly port wing low, this tendency increasing as the speed drops. Thus, if the speed is low it is obviously dangerous to bank steeply, especially in the direction of the dead engine.

In these circumstances when landing a twin-engined aircraft with one engine only, the practice is to maintain height and

speed so as to enable the approach to be made more steeply than with two engines, it being remembered that once the undercarriage and/or flaps are let down the difficulty of regaining height or speed is far greater than when the power of two engines is available. For these same reasons if the circuit is being made at a low height it is desirable to fly a tight circuit so that the aircraft may not be too far from the threshold of the runway when the turn onto final approach is made.

If the aircraft loses flying speed it will stall, this event being preceded by "noticeable buffeting" or "shuddering". There can be no doubt that this aircraft undershot the runway and stalled port wing down some 1 200 yards from its threshold.

At 2116 hours, when the aircraft informed the control tower of the port engine failure and that it was making a left hand circuit to come in again, it is reasonable to assume that the captain would have already taken the appropriate action which would include feathering the port propeller. On examination after the crash it was confirmed that the propeller had been feathered. In the course of the Inquiry it was suggested that the captain ought to have attained more height before attempting the circuit and that he ought to have made his circuit to the right, namely against the live engine, instead of to the left.

The captain decided to turn to port at once rather than to attempt to gain further height before doing so. Although turning against his dead engine, the captain was turning in the normal circuit direction and, since the emergency occurred at night, a turn to port had this great advantage that it enabled him, whilst sitting in the captain's seat on the port side, to keep the lights of the airport in view, whereas, if the turn had been to starboard, this would have been far less easy.

From the statements of witnesses and messages from the aircraft it was concluded that from the moment that G-AJBO turned

to port it made its circuit certainly without gaining and probably whilst losing height steadily. No sort of anxiety was apparent amongst the crew and everything appeared to be set for a successful landing. The aircraft appeared to one observer to be lower than he himself would have wished to be.

The lighting of the airport on the evening in question was adequate and had no effect on the accident.

It is curious to note that the aircraft when proceeding to take off never asked for the QFE, i. e. the barometric pressure at Blackbushe, but was merely informed of the QNH i. e. the barometric pressure at Chatham. Although not strictly encouraged, it is common practice in a twin-engined aircraft, when there are two altimeters to set the QFE on one and the QNH on the other. In this particular case, if the captain was judging his height from an altimeter on which he had set QNH instead of QFE, he might have supposed that his height on turning onto final approach was 550 feet instead of only 250 feet. He only asked for the QFE a little more than half a minute before the aircraft actually crashed. One of the altimeters recovered from the aircraft was found to be set at 1 020 millibars, a setting almost equivalent to the QNH, but it was impossible to prove whether the altimeter in question was that in front of the captain's seat. Unless some such confusion took place, it is difficult to understand how this aircraft found itself so low at so great a distance from the threshold in all the circumstances of this flight.

#### Crew Experience and Qualifications

The captain had flown a total of 6 800 hours, of which 4 800 hours had been flown with Viking aircraft and of these some 1 586 with Eagle Aviation Limited. He had made no less than 36 night landings in Viking aircraft at Blackbushe alone in the period of eighteen months prior to this accident.

On examining the record of the captain it was found necessary to consider in some

detail the actual tests of ability to which he had been subjected.

These tests were of three sorts -

1. the type rating test - in order to qualify for the inclusion of Viking aircraft in Group 1 of his licence;
2. tests for the purpose of renewing his instrument rating;
3. tests conducted from time to time to satisfy the requirements of Article 18(4) of the Air Navigation Order, 1954 and Regulation 44 of the Air Navigation (General) Regulations, 1954.

Examination of the circumstances of some of these tests and of the records relating to them disclosed certain defects.

#### Type rating test

For this test the candidate is required to make at least four take-offs and landings, two by night and two by day, one landing in each case being made with the use of both engines and the others on one engine only. Control tower records, however, show that only three take-offs and landings were made on the occasion of the test in July 1955, none of these being made at night. The captain was, therefore, granted a Group 1 rating for Viking aircraft on the strength of a check pilot's certificate which stated, apparently incorrectly, that the test had been properly completed.

#### Tests for renewal of instrument rating

The captain took this test on 26 April 1956 at which time he failed Part 2 (airways procedure) and Part 3 (instrument landing and overshooting procedure). Five days later he took the test again and it was successfully completed. He took this test again on 9 April 1957 and was checked and passed by a check pilot in the course of a passenger-carrying flight from Blackbushe to Le Bourget and back. The Commissioner found it difficult to believe that Part 3 of the

test and in particular the procedure on overshooting could have been properly conducted on such a flight.

#### Regulation 44

Regulation 44 prohibits the operator from permitting any person to fly as a pilot unless his competence to act as such and to use the equipment provided in the aircraft to enable him to act in that capacity has been established either:

- a) by a test administered by the operator within a period of six months immediately preceding the flight;

or b) by two tests administered by the operator within a period of twelve months immediately preceding the flight, the period between the two tests being not less than four calendar months.

The precise nature of this test, usually called "the six-monthly check", administered to test the pilot's competence, is left to the operator, subject only to the fact that a liaison officer of the MTC A visits the various operators in his area to check their records, including the records of these particular tests; and he would inform the operator if he regards the test as in any way insufficient. The records of five six-monthly checks of the captain's competence were examined by the Court; of these only two were considered to have been conducted satisfactorily.

There was no satisfactory evidence that in the course of his employment the captain was ever required to land an aircraft at night on one engine, although he did make such a landing on at least two occasions by day.

The Commissioner considered that:

- 1) The type rating test in July 1955 did not comply with the regulations and did not include a landing with one engine inoperative in night conditions.

- 2) It was doubtful whether the instrument rating tests conducted in April 1957 can have been a proper test.
- 3) Three of the five six-monthly checks did not amount to satisfactory tests to satisfy the regulations.

The six-monthly test is essentially the responsibility of the operator and the liaison officer informed the Commissioner that in the course of his visits, which he stated he normally made every six months, he makes a spot check by naming two or three pilots and then asking for their records. He had not found any significant fault in the case of those he had examined but had not seen those of the subject captain. It must be understood that the liaison officer covers a large area including a number of operators and cannot check everything.

The Commissioner considered whether any weight is to be attributed to the deficiencies referred to in the tests carried out by the captain in connection with the circumstances of this accident and in particular the fact that he had no recent experience of making a night landing with one engine inoperative. He concluded that he would not be justified in doing so.

The subject captain was a very experienced pilot, particularly in Viking aircraft and very experienced in making night landings in normal circumstances. The fact that he may in the course of tests many months before have fallen below standard is common in the experience of any pilot and must be viewed in proportion and against the background of his general experience and efficiency.

#### Probable Cause

The accident was caused by the failure of the captain to maintain height and a safe flying speed when approaching to land on one engine after the failure (or suspected failure) of the port engine for reasons unknown.

#### Recommendations

The Commissioner regarded the matters disclosed in regard to the various tests as matters upon which he should consider recommendations rather than as having any necessary connection with the circumstances of this particular accident.

The defects in regard to the various tests to which the subject captain was put clearly require consideration with a view to improvement and to ensuring that the regulations are properly complied with.

Various suggestions were made by Counsel with particular reference to the captain's six-monthly checks. It was suggested that any application for renewal of the pilot's licence should be accompanied by some form of record of the completion of the six-monthly check, also that not all tests or checks should be carried out under examination by a captain in the same company as the pilot, and that the MTCA should lay down in detail the precise nature of the test required to comply with Regulation 44 and should insist that testing at night is included. It was also proposed that the MTCA should inspect the records of all pilots at regular intervals and that regulations should forbid the carrying out of tests in the course of passenger flights.

To these suggestions Counsel for the MTCA raised various objections. It was said that the efficient conduct of operating companies was best left to themselves subject to gentle prodding from time to time towards a higher standard from liaison officials. It was pointed out that more regulations and more forms, whilst they may require more civil servants to file, administer and enforce, do not necessarily lead to greater efficiency. Emphasis was placed on the fact that it is in the interests of operating companies themselves to observe the regulations and maintain the highest standards of efficiency.

The Commissioner felt that the argument that everything should be left to the operator was too optimistic. The fact remains that in this accident 34 people

were killed. Whilst it may have had nothing to do with the accident it remains true that the pilot had not carried out properly the test required to fit him to fly this aircraft, had not at any rate in the last two years landed a twin-engined aircraft with one engine inoperative "at night", the very manoeuvre which he was required to perform on this occasion with a full load of passengers, and further the various six-monthly checks which he should have undergone and which should have included landing with one engine inoperative had not in three cases out of five done so in fact. It is also doubtful to what extent he had been properly practised in instrument flying. The Commissioner recommended that these matters should receive the attention of the MTCA with a view to consideration of the most convenient steps to prevent a similar state of affairs.

The Commissioner made the following suggestions for consideration in regard to the three types of tests:-

1) The type rating test

This is an important test because depending on its result the pilot or candidate for qualification may or may not become licensed to fly a type of aircraft. At present the candidate is examined by any pilot who has himself the qualification for which the candidate is applying, and the only parties involved are the MTCA and the examining and candidate pilots. On completion of the test the form C. A. 528 is transmitted to the Ministry, and save for providing the aircraft for the test and perhaps paying for the fuel consumed the operating company which employs the examining and/or candidate pilots is not directly concerned.

Unless the Ministry through its officials is to conduct the test or those pilots allowed to conduct it are to be selected by the Ministry the responsibility must be placed upon the operating companies. Just as certain operating companies are authorized to carry out instru-

ment rating tests through approved pilots so it is suggested they should be authorized to carry out this test, the pilots whom they select to examine being approved by the Ministry for the purpose. If this responsibility were placed on the operators and if any serious departure from the regulations was visited by withdrawal from the operating company of its qualification, a very much higher standard would be enforced by the companies in question since removal of the qualification would involve serious practical disadvantages.

So far as the form used is concerned it is far from clear. It should specify in terms the number of take-offs and landings involved and require the times of each whether by day or by night to be stated.

2) The instrument rating renewal test

It is suggested that steps be taken to ensure that part 3 of the test is only carried out in the course of a special flight.

3) The six-monthly check

Again, in so far as this involves landing with one engine inoperative, insistence should be placed upon it being conducted on a special flight.

There is no need for the MTCA to lay down the matters which ought to be comprised in the test; these are, of course, well known to operators and can be checked by the Ministry's liaison officers. However, at least every other test ought to include a landing with one engine inoperative at night. It is desirable that the checking by the Ministry's liaison officer of the records of these tests should be facilitated by the operating companies. The present system by which the liaison officer calls for the forms in relation to two or three pilots as a spot check may mean that the records of some pilots are never checked at all and the unsatisfactory character of some of the tests may never be detected. It would not be difficult to insist that each operating company should provide a statement of the test as laid down and maintain in tabular



form a record of the tests as completed by each pilot. This would enable the Ministry's liaison officer to observe at a glance the broad position and he could then, if he thought necessary, send for the more detailed records of individual tests. Alternatively, operating companies could be required to provide a certificate as to the carrying out of the tests confirming that all pilots had been tested in accordance with the regulations, any exceptions being stated. Most of these matters would not require further forms or regulations but could be dealt with by letters of request from the Ministry to the operating companies. None would seem to involve much, if any, additional labour or time in the Ministry, and it was thought that a procedure which would require operating companies to keep a close eye on these tests and ensure their proper conduct would be welcomed by most companies and certainly no company operating troopship contracts would be likely to withhold its co-operation.

Finally, a point arose from the sole survivor's evidence. He stated, "No instructions were given concerning emergency exits, their location or manipulation by any member of the crew."

It should be made clear that the above sentence is not to be regarded as any criticism of Eagle Aviation Ltd. since there is no obligation to give such instructions. It is the practice of some airlines to do so either verbally or by means of a safety instruction pamphlet. It is to be observed that in this case the survivor had noticed that the window exit next to him was labelled "Emergency Exit - Push" and had done so and was followed by a few other passengers. It is a matter for speculation whether, if instructions had been given, more of the other passengers might have acted in the same way. The question of whether instructions should be given, and if so, in what form, is deserving of consideration

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