

No. 13

British United (C.I.) Airways, Douglas Dakota C-47, G-ANTB, accident near Jersey Airport, Channel Islands, on 14 April 1965. Civil Accident Report No. EW/C/097, dated January 1966, released by the Ministry of Aviation, United Kingdom, C.A.P. 256

1. - Investigation1.1 History of the flight

Flight 1030X was an extra scheduled international flight from Paris (Orly), France, to Jersey, Channel Islands. It took off from Orly at 1626 hours GMT. At 1706 hours, when about 100 miles from Jersey, the pilot made his first radio contact with Jersey zone concerning the Jersey weather. At 1742 hours he informed Jersey zone that he was descending to 1 500 ft and estimated Jersey at 1755 hours. He was then given the 1720 hours Jersey weather report, which included visibility 80 m, RVR 200 m and 8/8 cloud at the surface, after which the aircraft was cleared to Jersey Approach Control. In response to the approach controller's question as to his intentions concerning diversion, the pilot replied: "We'll come down the ILS and then overshoot and go to Dinard." The controller then cleared the aircraft to 1 000 ft and passed the QFE as 1 007 mb. The aircraft arrived at the Jersey beacon at 1753 hours and began an approach to runway 27, during which the guidance provided from the ILS was supplemented by distance information provided by the controller from the indications of the Decca 424 radar.

The approach, the subsequent overshoot and the climb to 1 000 ft appear to have been without incident, following which the pilot informed the controller of his intention to make another approach and requested radar guidance back to the ILS outer marker. After directing the aircraft into position for a second approach to runway 27, the controller advised the pilot to take up his own headings on the ILS and informed him at 1803 hours that the aircraft was 5 miles from touchdown. Just after being given a distance of 4 miles, the pilot reported passing the outer marker and also that he was established, thus indicating that guidance was being received from the ILS and being used for the approach. Subsequent distance information was given by the controller at 1.5 miles, which was not acknowledged by the pilot, and again at 1 mile (at 1806:13 hours). Both these transmissions were clipped and are recorded as "... and a half miles now" and "... mile from touchdown". The latter transmission provoked an immediate "how many?" from the pilot, to which the controller replied by giving "three quarters of a mile now and left of the centre line." The pilot acknowledged this at 1806:24½ hours with "TB" (the final two letters of the aircraft's registration). This was the last communication received from the aircraft.

According to the air hostess, (the sole survivor), the flight was uneventful up to the time of the accident. She did not have any feeling of descending at any time. There was a bump which she attributed to the starboard undercarriage wheels having hit something; this was followed by a momentary roll to the right and a much greater roll back to the left.

Subsequently, it was established that the aircraft had hit with its starboard wing the outermost approach light pole, which was 3 000 ft from the runway threshold, at a height 58 ft above runway level. After climbing slightly, it rolled to an inverted attitude, at which time the starboard wing folded rearwards and separated as the aircraft dived to the ground, still inverted. It crashed at about 1806:27 hours.

1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	3	23	
Non-fatal	1		
None			

1.3 Damage to aircraft

The aircraft was destroyed.

1.4 Other damage

There was no damage other than the broken approach pole.

1.5 Crew information

The pilot-in-command, aged 31, held a current airline transport pilot's licence endorsed in Group I for Dakota C-47 aircraft. He was promoted to pilot-in-command on Heron aircraft in July 1960 and on Dakota C-47 aircraft in April 1963. He completed his last competency check and instrument rating renewal flight test on 9 December 1964. He had flown a total of 4 750 hours, including 1 227 hours in command of this type of aircraft.

The co-pilot, aged 27, held a current commercial pilot's licence endorsed in Group 2 for Dakota C-47 aircraft and a current instrument rating. His last competency check was completed on 20 October 1964 and his last instrument rating renewal test on 12 June 1964. He had flown a total of 1 188 hours, including 730 hours as co-pilot on this type of aircraft.

The second officer, aged 24, held a current commercial pilot's licence endorsed in Group 2 for Dakota C-47 aircraft and a current instrument rating. On 7 April 1965 he passed a competency check and was approved as co-pilot under supervision on this type. He had flown a total of 2 827 hours, including 31 hours as co-pilot on this type of aircraft.

At the time of the accident the pilot-in-command was occupying the first pilot's seat, the co-pilot was standing on the flight deck and the second officer was in the co-pilot's seat. None of the pilots had exceeded the statutory flight time limitations.

The air hostess, aged 23, joined the airline in March 1965, having previously been an air hostess with Air France for one year. She completed her training and passed her tests in emergency procedures for Dakota and Herald aircraft on 23 March 1965.

1.6 Aircraft information

The aircraft had a valid certificate of airworthiness. The maintenance of the airframe and engines had been carried out in accordance with an approved maintenance schedule and the aircraft's certificate of maintenance was current at the time of the accident. The aircraft had flown a total of 18 544 hours.

According to the technical report signed by the pilot-in-command prior to departure from Orly, no technical defects were reported and the aircraft was not refuelled at Orly. According to the load sheet, the fuel on board for the flight from Orly to Jersey was 280 imperial gallons which gave an estimated endurance of 3:30 hours, sufficient for the flight to Jersey plus diversion to London (Gatwick), the furthest nominated alternate, and 48 minutes holding. With this fuel load the weight of the aircraft on departure from Orly would have been 12 150 kg. However, subsequent calculation has indicated that there were probably 322 imperial gallons on board for this flight, which resulted in a weight of 12 285 kg for take-off. The maximum total weight authorized for the aircraft according to the certificate of airworthiness was 12 712 kg, but the French authorities by an Arrêté of 7 September 1960 imposed a limit of 12 200 kg on the operation of this type of aircraft within France.

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

1.7 Meteorological information

During the pre-flight meteorological briefing at Jersey at 1255 hours, the three pilots were informed of the deteriorating weather situation and its probable effect on their return flight. The main weather feature affecting Jersey was a broad warm front to the west of the Channel Islands which was expected to pass Jersey in the mid-afternoon. At 1220 hours this front was already producing 2 oktas of low cloud at 100 ft and 7 oktas at 200 ft with rain and drizzle, the weather being expected to deteriorate further with the arrival of the front and to continue poor after it had passed.

The forecast for Jersey and Guernsey provided at Orly for the return flight was the forecast originated by the Jersey meteorological office at 1140 hours. This gave a visibility of 5 000 m and 8/8 cloud at 90 m in drizzle with intermittent changes to 500 m visibility, and 8/8 cloud at the surface in rain. The later forecast for Jersey and Guernsey issued by the Jersey meteorological office at 1450 hours gave a visibility of 200 m and 8/8 cloud at the surface, but this did not arrive at Orly sufficiently early for inclusion in the forecast provided for the flight. A report of the 1520 hours weather observation at Jersey was passed to Paris on the direct telephone link at 1545 hours, but there was no evidence that the pilot received this. A subsequent observation also passed by telephone, which included information that there was 8/8 cloud on the surface and an RVR of 250 m, was passed to the aircraft by Paris Control at 1653 hours.

The following weather observation was made at Jersey at 1814 hours (8 minutes after the accident):

Wind: 260°/15 kt
Visibility: 70 m
Cloud: 8/8 at the surface
Weather: continuous slight drizzle
QFE: 1007 mb
QNH: 1017 mb
Runway visual range: 250 m
Temperature: + 9°C

1.8 Aids to navigation

The ILS serving runway 27 had an off-set localizer with a QDM of 2730 which crossed the extended runway centre line 777 m from the approach end of the runway. The glide path was set at 3° and marker beacons were provided at the outer and middle marker positions. A note promulgated in the Air Pilot concerning the ILS installation on runway 27 at Jersey included the following:

"Pilots are warned of slight fluctuations over the whole of the ILS localizer and glide path courses which may cause unsteadiness of the aircraft's indicating needles. Pilots are advised that the glide path should not be used below two dots fly up."

Decca 424 approach radar was available; this was used to provide heading and distance information.

All of the above facilities were functioning normally at the time of the accident, notwithstanding the issue of a Class 2 NOTAM to the effect that the ILS glide path should be used with caution due to work in progress in the vicinity.

The aircraft radio navigation equipment relevant to this accident consisted of one ILS localizer receiver, one ILS glide path receiver and one radio compass (ADF) receiver, the control boxes of these being on the left-hand side of the flight deck and under the control of the pilot-in-command; the associated instrumentation was on the port flight instrument panel. There was a separate VOR installation under the control of the co-pilot with an indicating instrument mounted on the starboard flight instrument panel. This VOR was capable of use with ILS localizer frequencies but there was no associated glide path receiver.

1.9 Communications

No communications difficulties were experienced up until the time of the accident.

1.10 Aerodrome and ground facilities

Jersey Airport is on the western side of the island and has a single runway 1 615 m long lying in the direction 091°/271°M. The aerodrome elevation is 276 ft. Approach lighting associated with runway 27 comprises a centre line and two crossbars of high and low intensity lights mounted on stout wooden telegraph-type poles. Visual approach slope indicators are provided. The runway lighting consists of a row of elevated lights on each side of the runway spaced 200 ft apart which are omnidirectional when used at low intensity and bi-directional at high intensity.

1.11 Flight recorders

Not mentioned in the report.

1.12 Wreckage

The wreckage lay almost on the centre line of the approach to runway 27 and about 830 yd from the runway threshold. The aircraft had struck the ground while inverted in a nose-down attitude of about 45° with the starboard wing detached. On impact, the rear section of the fuselage had broken off in line with the trailing edge of the wing and turned right way up. The flight deck area was severely crushed. The separated starboard wing lay 40 ft to the south-east of the main wreckage.

1.13 Fire

Fire had occurred on impact in the centre section and the wing root areas and had consumed the forward passenger compartment. The airport fire equipment arrived at the scene of the accident at 1813 hours and by 1825 hours the fire had been extinguished.

1.14 Survival aspects

The air hostess found herself still strapped in her seat in the wreckage which was already on fire. Although severely injured, she crawled out of the separated rear fuselage and was later dragged fully clear of the wreckage.

1.15 Tests and research

None mentioned.

2. - Analysis and Conclusions

2.1 Analysis

Evidences revealed that the undercarriage was down and locked, that flaps were at a half-flap setting and that both engines were operating at low power at the time of impact with the pole. No indications of malfunction or failure were found in the vacuum pumps, the Pitot and static system or the radio equipment of the aircraft.

The flight plan filed with ATC at Orly designated Jersey as destination and Dinard and Gatwick as alternates, but the flight forecast folder did not include a landing forecast for Gatwick. (In the event, the weather at Gatwick at the relevant time was above the airline's weather minima.) The weather at Dinard reported to the pilot before the first approach at Jersey was commenced indicated Dinard was being affected by low cloud and might be below airline's minima: he nevertheless declared his intention to divert to Dinard if unsuccessful in landing at Jersey but subsequently requested a check on the Dinard weather.

It was suggested that the pilot may have been influenced in this decision to attempt a landing approach at Jersey by doubts regarding the amount of fuel available and the possibility of marginal weather conditions at his nominated alternates. Such a hypothesis did not appear tenable, having regard to the adequacy of the fuel reserves, the extent to which the Jersey weather had been consistently reported and forecast as continuing bad, and the alternative of returning to Orly which existed throughout the flight.

The last Jersey weather report passed to the aircraft at 1755 hrs gave the visibility as 60 m with 8/8 cloud on the surface; at 1750 hours and 1805 hours the runway visual range of 250 m was passed. The minimum runway visual range for this runway, using full ILS, laid down in the airline's operations manual was 350 m. The manual forbade the

commencement of an approach when the runway visual range reported was less than the minimum specified for the aid being used. It was clear that both the first approach and the fatal second approach were made in disregard of the approach ban laid down in the operations manual. Also, since the ILS glide path had been notified as "use with caution", it would have been prudent for the pilot to apply the weather minima appropriate to an inoperative glide path, namely a runway visual range of 400 m and a critical height of 300 ft notwithstanding the fact that, unknown to him, the ILS was operating normally.

The pilot's query about the QFE before departure from Jersey for Paris indicated a 3-mb discrepancy in the aircraft altimeter reading but closer examination showed that the barometric pressure at aerodrome elevation was 1 008.6 mb when the QFE was (properly) given as 1 009. In the ambient conditions 2.6 mb represented a height difference of 70 ft. There was no evidence to indicate whether the discrepancy applied to one or both pilots' altimeters but the tolerance of the type of altimeter used is ± 60 ft at sea level. Against this background the discrepancy assumed less significance. If the captain had any reason to suspect the altimeter accuracy after the further opportunity of checking it at Orly, it was considered unlikely that he would have relied upon its indication in the weather conditions prevailing during the approaches at Jersey. Further, the absence of any entry in the pilot-in-command's technical report implied that he did not believe it to be faulty. Notwithstanding these considerations, if the altimeters had been reading 70 ft too high at the time of impact with the approach light pole, they would still have indicated a height substantially below the lowest critical height that might have been used. Additionally, the ILS glide path indication would have been giving a full deflection fly-up signal well before the aircraft struck the pole.

Examination of the pilot-in-command's altimeter face showed the millibar setting to have been 1 007 mb at the time of impact, which is the same as the QFE at that time. The co-pilot's altimeter setting of 1 002 mb was considered most probably the result of movement during the crash. The request, during the first approach, for range information when the aircraft was one mile out might be indicative of a wish to check the altimeter accuracy in the knowledge that with a 3° glide path each mile from the ILS reference point represents approximately 300 ft of height. Alternatively, having satisfied himself as to the altimeter dependability, the pilot might have wished to check the accuracy of the glide path because of the note in the Air Pilot concerning fluctuations of the glide path and the NOTAM advising caution in its use. In this connexion it was noted that the radar ranges as passed to the aircraft during the second approach were clipped at the beginning of the messages and there was no acknowledgment of the 1.5-mile range; also the 1-mile range report appeared to give rise to some surprise. During this approach, therefore, it appeared that the pilot obtained an imprecise indication of when the aircraft was at a range of 1 mile. It was not possible to conclude whether the request for range information was motivated by a wish simply to supplement the guidance already available or whether other uses of the information were intended.

An assessment of the visual conditions in the vicinity of the initial impact at the time of the accident indicated that the maximum distance from which the outermost approach lights could have been seen near the surface could not have exceeded 325 yd. This figure must have been substantially reduced for the pilot, since allowance must be made for viewing the light through a windscreen in drizzle and for the intervention of cloud extending from the surface and rapidly increasing in density from the ragged base. It was consequently considered that there was little or no possibility of seeing the outermost approach light from any position on the nominal ILS glide path. While flying directly at the light at a ground speed of about 80 kt, there was an insufficient time period to allow the pilot to see the light and react and for the aircraft's flight path to change sufficiently; this suggested that the distance at which the light became visible from the flight deck was less than about 160 yd.

The impact of the wing with the approach light pole resulted in major structural damage to the aircraft which in turn led to a catastrophic accident. It was therefore pertinent to consider whether the mounting of approach lights on frangible masts might have resulted in some reduction in the severity of the accident. The wooden pole on which the approach light was mounted was similar in type to a telegraph pole and approximately 10 in in diameter. It stood among a number of mature trees between 40 and 50 ft high and there was a large house between this pole and the next in line. The nature of the approach area can be seen from the photograph (see Figure 13-1), taken shortly after the accident, on which the approach light poles have been emphasized. Although it is possible that if the aircraft had not suffered vital damage on impact with the pole it would have struck a building or some trees, it has to be remembered that, notwithstanding the damage suffered from the pole, the aircraft cleared the top of the house and the next-in-line approach light pole before crashing. This indicated a possibility that it might have been gaining height at the moment of striking the pole; if so, the provision of a frangible mast in its place might have reduced the severity of the accident. In order to have gained the full advantages of a frangible mast in this particular case, it might have been necessary for the area to have been cleared of other obstructions. An aircraft on the glide path would clear this pole by 135 ft, but this should not detract from the use of frangible masts when this is reasonably practicable.

Inevitably the safety of flight operations in the ultimate analysis rests upon the skill and responsible judgement of the pilot. Although the instructions which he is given should be aimed at directing his judgement in such a way as to ensure as far as possible that unsafe decisions cannot be taken, experience regrettably shows this objective is not always achieved. Examples are afforded by accidents to aircraft attempting to land in totally unsuitable weather conditions and which sometimes, as in this case, have led to serious loss of life. The runway visual range element of weather minima normally provides little margin for pilots to exercise any discretionary assessment of the conditions, and there is a need to bring about a more active appreciation that successful completion of a flight in worse than minimum conditions, although it might have some transitory commercial advantage and perhaps induce a sense of self-satisfaction, may be but the forerunner of an accident.

Although the responsibility in such accidents may appear to lie primarily with the pilot, since his is the decision whether or not to land, the prevention of accidents from this cause is a matter to which operators and the authorities can also contribute. In a large measure, it depends upon the operator's organization and the extent to which this applies adequate operational supervision. Complete adherence to weather minima limitations involves the operator in economic penalties and, unless he is persuaded that his competitors are equally concerned to conform, it is unrealistic to ignore the possibility that he may sometimes accept a potentially dangerous situation: it is in relation to this aspect that the authorities can play their part.

There exists at present no requirement for an air traffic controller to call the attention of a pilot-in-command to the prevailing conditions in relation to the applicable weather minima and it would appear to be impracticable for him in many circumstances to exercise responsibility of this kind. Further, there is general agreement that it is for the aircraft's pilot-in-command to decide whether an approach to land in compliance with his minima can be made. It is essential, particularly in the case of emergency, that no doubt should arise that responsibility for the safety of the aircraft is vested in the pilot-in-command, who should be best able to assess all the relevant factors.

2.2 Conclusions

Findings

The pilots were properly licensed.

The aircraft had been properly maintained.

There was no pre-crash failure of the aircraft, its engines or equipment.

There was adequate fuel on board for the proposed flight and for diversion to the nominated alternates.

The reported weather at Jersey was below the landing minimum specified in the airline's operations manual.

The aerodrome facilities at Jersey Airport operated satisfactorily within the notified limits.

In commencing and continuing approaches to land at Jersey the approach ban laid down in the operations manual was disregarded.

The second approach was made below a safe approach path while the aircraft was under the full control of the pilot.

Cause or Probable cause(s)

The aircraft struck the approach lighting when it was flown below the safe approach path during an approach to land in conditions of very low cloud and poor visibility, the pilot having disregarded the approach ban applied by his operations manual.

3. - Recommendations

A survey should be made of approach lighting installations with a view to their replacement in appropriate cases by more effectively frangible installations.

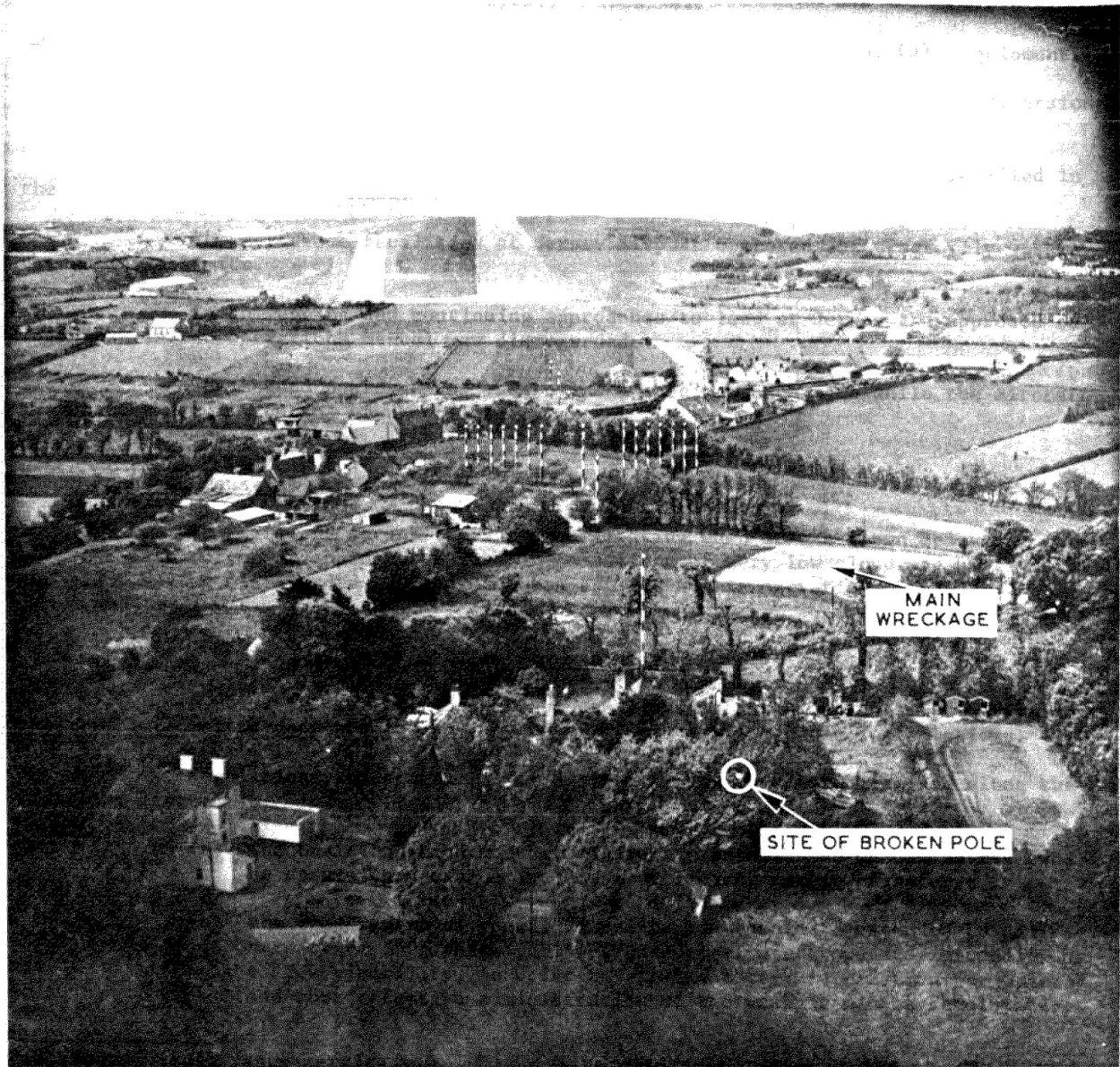
Regulations and practices for weather minima should be examined along the following lines:

- (a) the basis on which weather minima are established should be reviewed to ensure that minima include a sufficient margin of safety;
- (b) the measurement of runway visual range* should be extended to all aerodromes into which public transport aircraft operate in conditions of low visibility, in order to provide better information for pilots and more effective administration of the weather minima regulations;

* A runway visual range service was, of course, provided at Jersey at the time of this accident.

- (c) aerodrome authorities should be required to maintain appropriate records so that any landing made in less than minimum conditions may be detected;
- (d) more effective arrangements should be introduced by operators where necessary to obviate reduction of safety in minimal weather conditions; and
- (e) action should be taken to penalize more effectively operations undertaken without sufficient regard for safety.

ACCIDENT TO DOUGLAS DAKOTA C-47, G-ANTB, OF BRITISH UNITED
(C.I.) AIRWAYS, NEAR JERSEY AIRPORT, CHANNEL ISLANDS,
14 APRIL 1965



Approach to Runway 27, Jersey Airport

Fig. 13-1