

AAIB Bulletin No: 7/94 **Ref:** EW/G94/03/11 **Category:** 1.3

Aircraft Type and Registration: Piper PA-28-181 Cherokee Archer II, G-BTAF

No & Type of Engines: 1 Lycoming O-360-A4M piston engine

Year of Manufacture: 1984

Date & Time (UTC): 23 March 1994 at 1938 hrs

Location: 1 nm south of Hemlington, Middlesbrough, Cleveland

Type of Flight: Private

Persons on Board: Crew - 1 Passengers - 2

Injuries: Crew - None Passengers - None

Nature of Damage: Substantial damage beyond economic repair

Commander's Licence: Private Pilot's Licence with IMC and Night Ratings

Commander's Age: 48 years

Commander's Flying Experience: 172 hours (of which 125 hours were on type)
Last 90 days - 18 hours
Last 28 days - 11 hours

Information Source: Aircraft Accident Report Form submitted by the pilot and subsequent enquiries by AAIB Inspector (Operations)

The pilot noted that after previous flights in the same aircraft over the previous two days, having carried out a return trip between Newcastle and Coventry, the aircraft was refuelled to full tanks with 123 litres of Avgas. Using the elapsed times from these flights, the pilot therefore calculated that the aircraft's fuel consumption rate was 6.75 gall imp per hour. Given a total useable fuel capacity of 40 gall imp, he calculated that this gave a maximum endurance of around 6 hours. The refuelling took place at around 1330 hrs, and the aircraft did not fly again until the day of the accident.

On the day of the accident, the aircraft flew from Newcastle to Norwich Airport, a total distance of 179 nm. It was on the return leg when the accident occurred. The outbound sector of the trip had taken 1 hr 50 min airborne time, landing at Norwich at 1004 hrs. The aircraft departed Norwich at 1705 hrs. The pilot had initially estimated that the flight would take 2 hours en route, but revised his estimate in the light of strong forecast winds aloft to 2.5 hours. The flight routed over Skegness, then via Ottringham VOR, then along a direct track towards Newcastle. The pilot reported that after passing Ottringham, progress seemed to slow, and he decided to continue towards Teesside Airport.

However, while being radar vectored towards the airport, the engine failed when one fuel tank ran dry. Switching to the other tank enabled power to be restored for a short time, and a direct approach was requested. The aircraft descended to 2,000 feet under radar guidance, and further power loss was encountered.

It was dark at this time, and the aircraft made a forced landing on the B1365 road to Hemlington, avoiding road traffic, and ending up slewing to the right into bushes and small trees, causing substantial damage to the airframe. There was no fire, and all occupants were uninjured and quickly vacated the aircraft by the normal means.

Forecast data was obtained from the Meteorological Office for the time of the return flight, and this indicated that the wind at 6,000 feet was 260°/55 kt, and at 3,000 feet was 250°/50 kt. Met Form 214 gave a forecast of 260°/65 kt at 5,000 feet. Given the route of the aircraft and the timings, the progress from Norwich to the accident location was generally around 10 kt slower than that expected.

At the time of the accident, the aircraft's total airborne time from full tanks was 4 hours 23 minutes, with an additional 10 minutes taxi time indicated in the technical log. An engineer who later examined the aircraft noted that there was no fuel whatsoever in the right tank, and only a very small quantity was recovered from the left tank.

Refuelling records for the aircraft were obtained by the AAIB, along with aircraft movement times obtained from ATC Aerodrome records for a period covering some 3 weeks prior to the accident, in order to assess the aircraft's actual fuel consumption pattern.

On the previous Newcastle to Coventry return flights, the aircraft was airborne for 3 hours 38 minutes, before requiring 123 litres of fuel to replenish the tanks. This gave an actual consumption rate of 7.45 gall imp per hour (making no allowances for taxiing/engine run-up time). The aircraft's other operations, which included both local and cross-country flights, gave a range of fuel consumptions between 7.45 and 9.25 gall imp per hour.

Inspection of the engine performance data in the Aircraft Flight Manual indicates that for Best Power Mixture (appropriately leaned), the fuel flow varies from 6.6 gall imp per hour at 55% power, to 8.9 gall imp per hour at 75% power, with corresponding maximum endurances between 6.0 and 4.5 hours.