

No: 8/90

Ref: EW/C1161

Category: 1c

Aircraft Type

and Registration:

- (1) De Havilland DH82A Tiger Moth, G-AOZB
- (2) Piper PA-28-181, G-BNNP

No & Type of Engines:

- (1) 1 De Havilland Gipsy Major 1 piston engine
- (2) 1 Lycoming O-360-A4M piston engine

Year of Manufacture:

- (1) 1940
- (2) 1985

Date and Time (UTC):

19 May 1990 at 1646 hrs

Location:

Near Redhill aerodrome, Surrey

Type of Flight:

- (1) Private
- (2) Flying instruction

Persons on Board:

- (1) Crew - 1 Passengers - None
- (2) Crew - 2 Passengers - 1

Injuries:

- (1) Crew - 1 (fatal) Passengers - N/A
- (2) Crew - 2 (fatal) Passengers - 1 (fatal)

Nature of Damage:

Both aircraft destroyed

Commander's Licence:

- (1) Private Pilot's Licence
- (2) Private Pilot's Licence with Instructor's rating

Commander's Age:

- (1) 31 years
- (2) 38 years

**Commander's Total
Flying Experience:**

- (1) 407 hours (of which 313 hours were on type)
- (2) 817 hours (of which 189 hours were on type)

Information Source:

AAIB Field Investigation

The Piper PA 28-180 Archer aircraft G-BNNP took off from runway 08 at Redhill aerodrome at 1555 hrs for a training flight towards an IMC rating. There were three persons on board; a pilot under training, a flying instructor and a passenger. At 1639 hrs the Tiger Moth, G-AOZB took off from Redhill for a VFR flight to Rushett Farm, with a single pilot flying the aircraft from the rear cockpit.

G-BNNP returned from the training flight and, at 1642.30 hrs reported to the Redhill Aerodrome Flight Information Service Officer (AFISO) that the aircraft was north of Reigate and had the field in sight. At 1643.30 hrs G-AOZB reported that he was climbing out to the northwest of Redhill. There were no further transmissions from either aircraft, however, at 1645.30 hrs an emergency MAYDAY message was transmitted by the pilot of G-BLJO reporting that he had observe a mid-air collision and that both

aircraft had gone down. He then flew towards the accident area and pin-pointed both aircrafts' positions and helped to direct the emergency services to the scene.

The aircraft had collided close to overhead the M25 motorway, at a point some 1.3 km east of junction 8, with G-AOZB crashing into a field on the north side and G-BNNP impacting into a school playing field on the south side. As a result of the collision some debris was shed from both aircraft which fell along a line roughly joining the two wreckage sites. Analysis of these sites showed G-BNNP to have impacted in a steep nose down attitude of some 75 degrees and at a speed estimated to have been in excess of 200 kts, which caused extreme crushing and disintegration of the forward fuselage and the engine and propeller to embed themselves several feet below ground level. G-AOZB had struck the ground on its right side with a relatively low vertical speed and whilst in a slight nose down attitude. Although it was evident from both sites that each aircraft had been carrying significant quantities of fuel, neither caught fire. As a result of a later detailed examination of the wreckages at AAIB Farnborough, it was established that the aircraft had struck each other with their right wings, whilst in a relative bank to the left of 50 degrees to each other and only some 20 degrees to the left of directly opposing headings, reference figure 1.

The wings of G-AOZB are mainly constructed of fabric covered wood, the upper wing is equipped with automatic leading edge slats. These slats are made of heavy gauge aluminum. The right side of this wing, in the region of the slat, struck the leading edge of G-BNNP's right wing, of conventional aluminum construction, approximately 6 feet in from its tip, and crushed its way through to sever the tip section and destroy the integrity of the aileron control system. The lower right wing also struck NP's wing, with its tip region penetrating and distorting the centre of the leading edge fuel tank, to leave embedded debris. In doing this, the structural integrity of the outer sections of ZB's right wings, its interplane struts and flying wires, was completely disrupted, whilst NP was left with a truncated and severely distorted right wing and with no effective roll control.

The detailed examination of the wreckages showed all flying controls to have been intact prior to the collision, and that all damage observed was as a direct result of the collision or ground impact. At the time of ground impact, both aircraft's propellers were rotating but at a low power condition. The documentation of both aircraft and pilots was examined and found to be in order.

From eye-witness evidence and examination of recordings from both Pease Pottage and London Heathrow radars it is apparent that prior to the collision both aircraft had been flying directly towards each other for a period of at least two minutes, and at a closing speed of approximately 180 knots. During this time G-BNNP was descending and G-AOZB was climbing. Flying on a northwesterly heading, the pilot of G-AOZB would have been heading almost directly into sun. The predominant colours of G-BNNP were light grey and blue. At the same time G-BNNP was descending on a southeasterly heading towards a background of undulating rural countryside. The predominant colours of G-AOZB were green and white. There is some evidence that the pilots may have seen each other's aircraft at the last second, but too late for either or both to complete avoidance action. Figure 2 indicates the likely 'dead ahead' field of view from the cockpits of these two aircraft. From this it would seem

likely that the crew of G-BNNP would have found it difficult, if not impossible, to see the other aircraft until it was extremely close. G-BNNP was fitted with strobe and landing lights. However, due to the state of the wreckage it was not determined if either had been selected on prior to the collision.

Weather conditions at the time were fine. An aftercast provided by the Meteorological Office, Bracknell, states that visibility was in excess of 20 kilometres and that there was one okta of stratocumulus cloud at 4000 feet. The collision occurred at an altitude of 1800 feet above ground level.



Figure 1

Approximate speeds



Figure 2

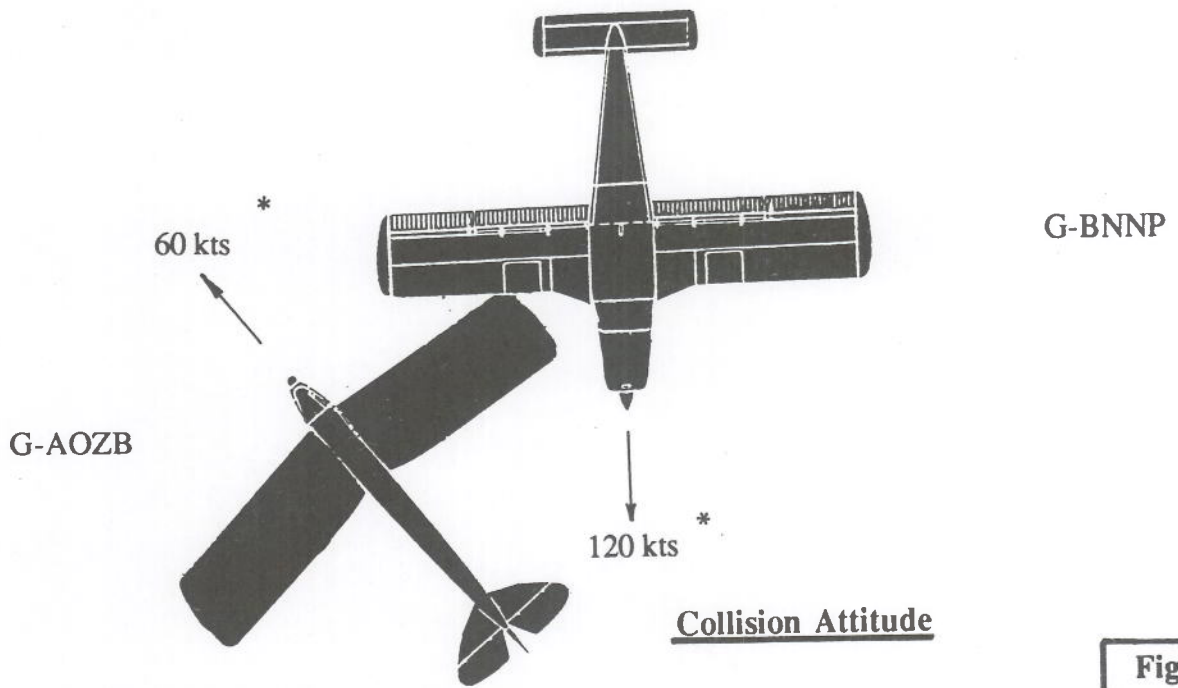
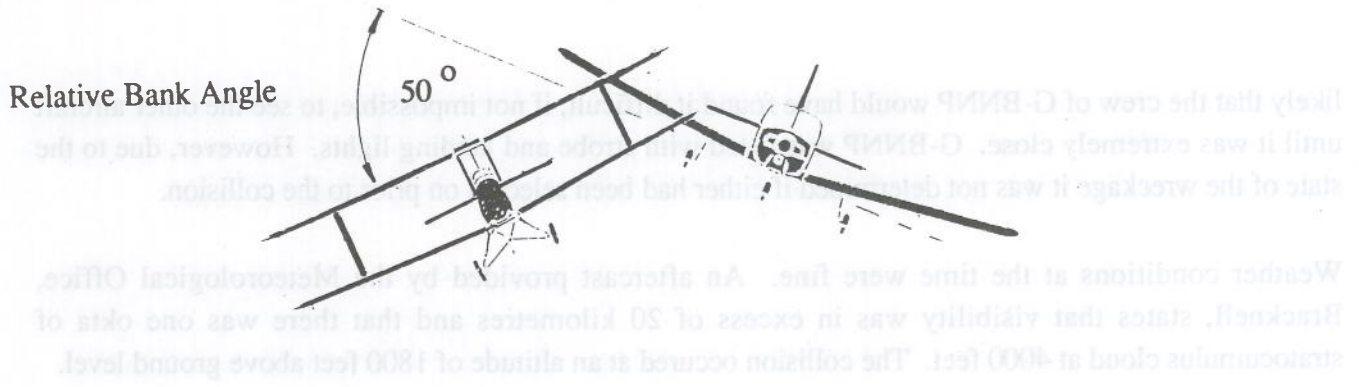
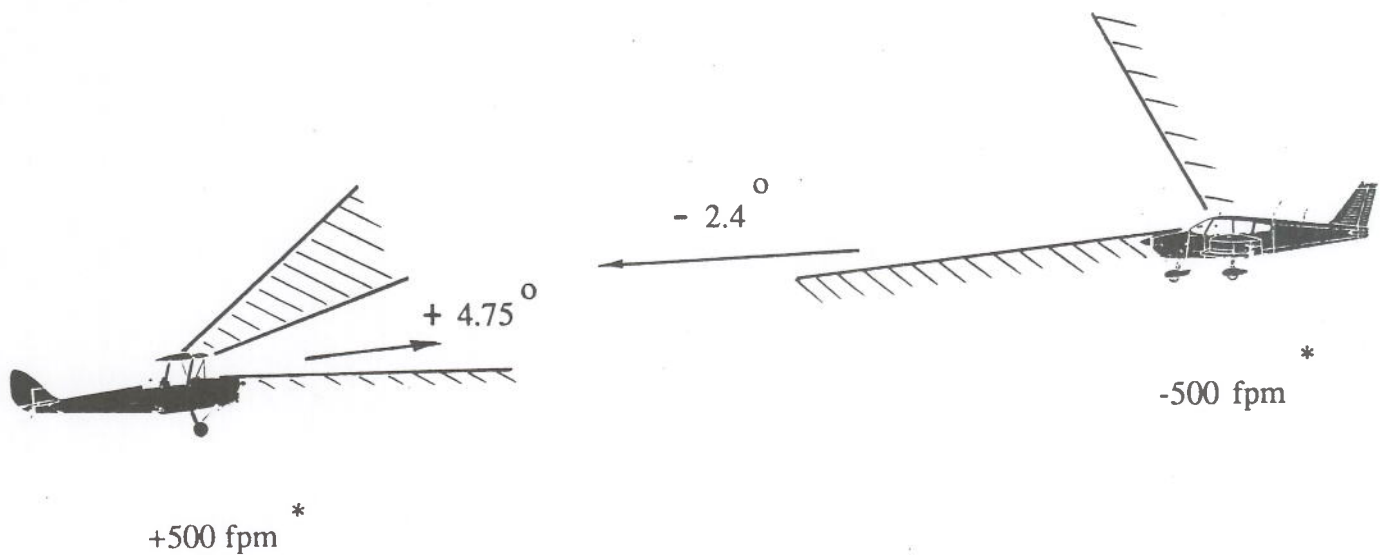


Figure 1

* - Approximate speeds



Likely 'dead ahead' vision cutoff and flight path angles

Figure 2