Fournier RF5B, G-BAPA

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Aircraft Type and Registration:	Fournier RF5B, G-BAPA
No & Type of Engines:	1 Sportavia-Limbach SL 1700-E piston engine
Year of Manufacture:	1973
Date & Time (UTC):	26 September 1997 at 1413 hrs
Location:	North Weald Airfield, Essex
Type of Flight:	Private
Persons on Board:	Crew - 1 - Passengers - None
Injuries:	Crew - Fatal - Passengers - N/A
Nature of Damage:	Aircraft destroyed
Commander's Licence:	Private Pilot's Licence (with SLMG rating)
Commander's Age:	72 years
Commander's Flying Experience:	1,046 hours on powered aircraft (62 on type)
	Last 90 days - 11.0 hours
	Last 28 days - 2.0 hours
Information Source:	AAIB Field Investigation

History of the flight

The pilot was member of a syndicate that owned and operated the aircraft, which was hangared at North Weald airfield. She had joined the syndicate in 1992, having been a tug pilot for the local gliding club. Her total flying experience in gliders and powered light aircraft could not be verified due to lack of documentary evidence, but her Private Pilot's Licence, which included ratings for self launch motor gliders and single engine aeroplanes (landplanes), was initially issued in August 1979. The syndicate records showed that she had flown the aircraft for a total of 9 hours and 20 minutes since March 1997 and had last flown the aircraft for 1 hour and 50 minutes on 23 July 1997.

Two days before the accident, on 24 September 1997, she had telephoned the company which owned the hangar in which the aircraft was kept in order to book it for a flight on the following day. She had intended to fly to Manston, Kent, in order to take one of her relatives for a pleasure flight, but the flight was subsequently cancelled due to poor weather. The flight was rearranged for the following day, Friday 26 September 1997.

The pilot arrived at North Weald at 1345 hrs on the afternoon of the accident and proceeded to the control tower to ask the Senior Operations Officer for information on the wind strength and direction. The weather was fine and dry, with good visibility and a surface wind of approximately 225 degrees / 15 kt. He stated that she had appeared in good spirits, but was concerned about possible strong winds that were forecast for Biggin Hill, her planned destination that day.

The pilot then went to offices near the hangar and asked two voluntary workers, who usually assisted in the hangar, to manoeuvre the aircraft from the hangar onto the adjacent hard standing. When they later arrived at the hangar, the pilot was already at the aircraft with the canopy open. The workers pushed other aircraft clear and then hand-towed 'PA' onto the hard standing. The aircraft had been parked in the hangar with both outer wings sections folded and since two persons were needed to unfold the wings, she asked the workers for help. One subsequently stated that the unfolding of the wings felt normal and recollected that both wings had appeared to reach their normal in-flight positions. They then chocked the aircraft and returned to their offices, leaving the pilot to carry out the normal pre-flight checks, including the locking of both wings. No one saw the pilot conduct her pre-flight preparation and it was only some time later that one of the workers saw the aircraft as it taxied past his office on the way to Runway 02. He stated that the sound of the engine and the appearance of the aircraft had seemed normal. Just prior to take off, the pilot contacted ATC to report that she was ready for departure. She was cleared for take-off, with a surface wind of 070 degrees/10 kt.

An aircraft engineer, who was near a hangar close to the runway, saw the aircraft during its take-off run and noticed the outer section of the right wing start to pivot upwards as the speed increased. The wing continued pivoting upwards and through 90° as the aircraft rolled right after lift-off. Another witness, on the western side of the airfield, had his attention drawn by the sound of the aircraft taking off and recognised the aircraft as a Fournier. He saw it as it reached a height of approximately 10 feet agl and stated that the left wing appeared normal, but the right wing was folded into the stowed position. He reported that the aircraft had climbed a further 10 feet before 'flipping onto its back, from left to right', before striking the ground inverted and bursting into flames.

After the impact, several witnesses attended the crash site and attempted to extinguish the fire and rescue the pilot. Unfortunately their hand held fire extinguishers could not extinguish the fire and they were not able to save the pilot. ATC recorded the time of the accident at 1413 hrs and alerted the emergency services immediately.

Engineering investigation

The accident site was on the south eastern edge of Runway 02, approximately one quarter the length of the runway from the take-off point that was in use that day. The site consisted of a flat area of short grass that lay between the south eastern edge of the runway and a three foot high wooden security fence that ran parallel to the runway and approximately 450 feet distant.

The accident site

Examination of the accident site indicated that the aircraft had impacted the grass area whilst inverted and on a heading that was almost 90 degrees to the right of the runway heading. The first ground impact mark had been made by contact with the top of the aircraft's fin, with subsequent ground marks caused by propeller blade strikes and the top of the cockpit canopy. The aircraft while still inverted had slewed to the right and impacted the wood paling security fence, where it came to rest. The fuel tank had ruptured during the initial impact sequence and the spilt fuel ignited. The post impact fire had almost totally consumed the broken remains of the aircraft. The evidence from the site examination indicated that, at impact, the aircraft had been pitched nose up (inverted) with the wings relatively level, travelling at about 50 kt and with the engine producing high power. The right outer wing section was found separated from the main wreckage, although within the fire affected area. Initial examination of the aircraft wreckage on site indicated that the right wing outer section had not been locked to the main wing when the ground impact had occurred.

Detailed examination of the wreckage

A later detailed examination of the wreckage confirmed that the right outer wing section had not been locked to the main wing, however the locking mechanism was in the 'locked' position and the associated fairing that fits over the area of the folding joint was fitted.

A similar aircraft type was examined and the outer wing section folding mechanism operated. From this examination it was found that in order to fold and unfold the outer wing section two people were required and that locking the outer wing section to the main wing could be difficult without a

second person supporting the wing tip. After the outer wing section was unfolded and the locking mechanism placed in the 'locked' position, an outer fairing was fitted around the wing to cover the folding joint. In addition, it was confirmed that it was not possible to fit the outer fairing with the lock mechanism in the 'unlocked' position. However, it was found that if the locking mechanism was in the 'locked' position, before the outer wing was unfolded, then the outer wing when unfolded would not lie in alignment with the main wing, but would adopt an increased dihedral giving the appearance of a 'cranked' wing. It was found that with the outer wing in this 'cranked' position it was virtually impossible to move the locking mechanism to the 'unlock' position without a second person supporting the weight of the outer wing section. It was also found that it was possible to fit the outer fairing over the folding joint with the outer wing section in the 'cranked' position and the locking mechanism in the 'locked' position, although the outer wing section was not actually locked to the main wing. It was noted that the aileron on the outer wing section remained connected to the aircraft's control column in the cockpit at all times, regardless of whether the outer wing section was folded, unfolded, locked or unlocked.

Previous accident

A similar event occurred to a Fournier RF5B, G-SSWV, in August 1994 (AAIB Bulletin No.11/94) where the right outer wing section had folded upwards during take-off. Fortunately in that instance the pilot had abandoned the take-off just prior to lift-off, resulting in a ground loop and minor damage to the aircraft. In that case, as with G-BAPA, the outer wing fairing had been fitted with the locking mechanism in the 'locked' position, but with the outer wing not locked to the main wing.