**No: 12/92** **Ref: EW/G92/10/01** **Category: 1c**

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| **Aircraft Type and Registration:** | Boeing Stearman PT-17, N38940 |
| **No & Type of Engines:** | 1 Continental piston engine |
| **Year of Manufacture:** | 1942 |
| **Date & Time (UTC):** | 1 October 1992 at 1230 hrs |
| **Location:** | Near Lake Vyrnwy, Powys |
| **Type of Flight:** | Private |
| **Persons on Board:** | Crew - 1 Passengers - 1 |
| **Injuries:** | Crew - None Passengers - None |
| **Nature of Damage:** | Wings and forward fuselage destroyed by fire after forced landing |
| **Commander's Licence:** | Commercial Pilot's Licence |
| **Commander's Age:** | 27 years |
| **Commander's Flying Experience:** | 1,535 hours (of which 48 were on type)<br>Last 90 days - 22 hours<br>Last 28 days - 13 hours |
| **Information Source:** | Aircraft Accident Report Form submitted by the pilot, examination of the aircraft and other Stearmans by AAIB |

The aircraft, an open two-place biplane, was on a cross-country flight from Coventry to Caernarvon, with the pilot in the aft cockpit and the passenger in the forward cockpit. Shortly after passing Llanfyllin, and over the Welsh hills, the pilot and passenger both noticed the engine beginning to run roughly and the pilot found that the engine power was intermittent, even at a constant throttle setting. He suspected fuel starvation and prepared for a forced landing. There were no level fields available so he landed up the slope (10-12° by measurement) on a hill-side, making a firm 3-point landing and coming to rest in 120 yards.

The aircraft had suffered no damage in the forced landing and the engine recovered to a steady idle. The pilot shut the engine down and he and the passenger both left the aircraft very quickly; the passenger remembers that, at some point before the aircraft stopped, he had smelt a strong smell of fuel. The pilot opened the right-hand cowling immediately aft of the engine firewall and was confronted with a fire already in progress. This fire spread very rapidly to engulf the forward end of the fuselage. The pilot and passenger retired to a safe distance as there was no fire extinguisher on the

aircraft, although the pilot did, a short time later, return to the aircraft to attempt to stem the obvious flow of fuel, but with no success.

In the Stearman design the fuel is gravity-fed from the fuel tank mounted in the centre-section of the upper wing; the two fuel lines are attached to the forward cabane struts and are then joined just below the fuselage upper decking, just aft of the engine firewall. From there, a single fuel line leads to the shut-off valve, also just aft of the engine firewall, and thence a single fuel line takes the fuel downward and through the firewall, into the engine compartment and forward to the fuel strainer.

In the fierce fuel fire, the entire fuel line between the shut-off valve (found in the open position) and the fuel strainer had been consumed and there was no evidence as to whether there had been a fuel leak in this portion of the fuel system. The pattern of the fire, and the evidence of the occupants, indicated that it had started aft of the engine firewall but the severe extent of the fire damage made it impossible to determine exactly where and how.

Only one anomaly was discovered in the area in which the fire had started. When the aircraft was being inspected after the fire, it was noted that one of the fuel-line unions, just below the fuselage upper decking, was found loosened and required only one half of one turn in order to become entirely disconnected. This condition was confirmed by the 'sooting' from the fire, which showed that less than one full turn of the screw thread had been engaged. A number of other Stearmans, with this fuel system, were inspected by the AAIB for comparison: all of the identical unions were engaged by at least three complete threads.

There was no positive evidence as to the source of the ignition. However, in this design the battery is mounted close to the firewall, just forward, in this case, of the passenger's rudder pedals and a large portion of the aircraft's electrical system is concentrated in this area.