AAIB Bulletin No: 4/94	**Ref: EW/G94/02/05**	**Category: 1.3**
Aircraft Type and Registration:	American AA-1 Yankee, G-SEXY	
No & Type of Engines:	1 Lycoming O-235-C2C piston engine	
Year of Manufacture:	1970	
Date & Time (UTC):	11 February 1994 at 1325 hrs	
Location:	Burscough, Lancashire	
Type of Flight:	Aerial Work (Training)	
Persons on Board:	Crew - 2	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Extensive	
Commander's Licence:	Commercial Pilot's Licence with Night and Flying Instructor Ratings	
Commander's Age:	29 years	
Commander's Flying Experience:	1,508 hours (of which 13 were on type) Last 90 days - 137 hours Last 28 days - 38 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot, and enquiries by AAIB Inspector (Operations)	

The instructor indicated that the aircraft had flown approximately 2 hours 20 minutes airborne time during two sorties since it was refuelled to full tanks (24 gall US) with Avgas 80/87. He commented that it was not possible, because of fuel tank construction, to check the fuel contents visually prior to flight. He also noted that the fuel gauging on this type of aircraft consisted of one sight glass and float mechanism for each wing tank, and that the system was generally regarded as being unreliable. The flying training organisation that operated the aircraft had instituted a system of calculating the fuel used from full tanks based on the actual hours flown (allowing for a consumption of 5 gall US per hour), and adding an allowance of 15 minutes to each sector to account for fuel used during taxiing operations. It was thus considered that, at the commencement of the accident flight, the aircraft had a total fuel contents of 9.8 gall US, although the instructor could not recall the contents indicated on the sight glasses prior to departure. The purpose of the flight was to carry out refresher handling exercises required for the renewal of a previously lapsed Private Pilot's Licence. It was intended to fly for 1 hour (using 5 gall US), and then to land at Woodvale Aerodrome for refuelling, leaving a 1 hour reserve on landing.

The aircraft taxied out at 1230 hrs, and took off from Liverpool at 1245 hrs. It carried out the handling exercises in the vicinity of Burscough, a disused aerodrome, to the north of Liverpool. After 50 minutes, the left fuel tank ran dry and the engine stopped. The fuel selector, which had three positions (Off, Left and Right), was switched to feed from the left tank, the sight gauge of which indicated one quarter of a tank remaining (3 gall US). The engine initially recovered and began to run normally, and a glide descent was commenced for a practice forced landing. Having completed that exercise, the student initiated a climb and was about to set course for landing at the destination when the engine again stopped, at about 1,500 feet.

The instructor took control and carried out the procedure for a forced landing. The site chosen was the Aerodrome at Burscough, but this had obstructions on the threshold of the disused hard surface runway. The instructor therefore elected to land on the grass adjacent to the runway, but this too had obstructions in the form of piles of heavy building rubble. In order to avoid a frontal collision the instructor raised the nose of the aircraft just prior to impact, and the underside of the engine/firewall area hit the obstruction. The aircraft bounced over this and came to rest a short distance beyond with the landing gear failed. There was no fire, and both occupants vacated the aircraft by the normal means.

During the post-accident engineering inspection, it was reported that the engine mechanical fuel pump was serviceable, but the auxiliary electric pump was found to be weak and performed poorly, taking some 2.5 minutes to fill the fuel line from dry, and only developed a pressure of 2 psi on completion. A total of 3 gall US of usable fuel was drained from the left tank after the accident.

On checking the ATC and refuelling records for both Liverpool and Woodvale, it was ascertained that the aircraft had been refuelled with 17.6 gall US of Avgas 80/87 at Woodvale on 6 February. It then flew one flight, to Liverpool, of 1 hour 12 minutes airborne time on that day. It then carried out one local flight from Liverpool on 7 February of 1 hour 43 minutes duration. It did not then fly again until the accident flight. Thus, a total of 2 hours 55 minutes airborne time had elapsed since refuelling, until the commencement of the accident flight. Calculating the revised fuel usage in accordance with the operator's policy, it is likely that only 6.9 gall US remained on board at the time of departure. A flight time of 40 minutes, plus a 15 minute taxi, would have used a further 4.6 gall US, leaving a quantity of 2.3 gall US on board at the time of the accident.

The Pilot's Handbook for the type states that the tank capacity of each wing tank is 12 gall US, of which 1 gall US is unusable.