ACCIDENT

Aircraft Type and Registration:	Piper PA-28-161 Cherokee Warrior III, G-CEXO	
No & Type of Engines:	1 Lycoming O-320-D3G piston engine	
Year of Manufacture:	1998 (Serial no: 2842041)	
Date & Time (UTC):	31 January 2016 at 1442 hrs	
Location:	Durham Tees Valley Airport	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Minor paint damage under and aft of the engine cowling, ADF aerial scorched	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	24 years	
Commander's Flying Experience:	142 hours (of which 139 were on type) Last 90 days - 68 hours Last 28 days - 39 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

After engine start, flames were seen by witnesses outside the aircraft around the lower cowling. They alerted the pilot, who shut down the engine and evacuated the aircraft along with his passenger. The fire was extinguished by a witness using a hand-held BCF extinguisher. The fire was caused by overpriming of the engine.

History of the flight

On the day of the accident, the pilot had flown the aircraft twice before. On the first flight, when the engine was cold, he used the electric primer pump for 50 seconds which he said was recommended by the engineer who maintained the aircraft following several previous pilot reports of starting difficulties.

The start was successful and, on the second flight, when the engine was warm, he used 25 seconds of prime and this, too was successful. However, during takeoff and climb at high power settings and low airspeeds, he noticed a faint smell of fuel. After landing he discussed this with two instructors who said that they had noticed the smell too and the aircraft had been inspected by the engineer who had found no leaks.

On the third engine start, when the engine was still warm, the pilot again primed for 25 seconds but this time it was reluctant to start, so he moved the mixture control to lean

whilst continuing to crank the engine on the starter. It now sounded as though it was close to starting, so he advanced the mixture control to full rich whereupon the engine started and ran up to about 1,000 to 1,200 rpm. However, he now became aware of a person pointing at the aircraft and shouting - through the open cockpit window vent he heard the word "fire". He retarded the throttle and shut the engine down with the mixture control, telling his passenger to evacuate. Whilst this was in progress, he transmitted a MAYDAY before turning off the electrical master switch and exiting himself. As he did so, he noticed another pilot discharging a BCF fire extinguisher into the fuel water drain access hole, apparently succeeding in extinguishing the fire.

Discussion

The fire was most probably caused by overpriming the engine, leading to a fire in the airbox/carburettor as well as in the cowling. The 'standard' starting technique the club had been using involved priming only for some six seconds, but recent problems with starting had led to several pilots priming for up to 50 seconds. The pilot states that he had had reservations about using so much priming, but had been reassured that it was acceptable if "that was what was required to start the engine".

The Pilot's Operating Handbook (POH) gave no limits on duration of priming but states that initially no prime should be used but then 'prime as required' if the first attempt was unsuccessful.