Enstrom F-28C, G-BURI

AAIB Bulletin No: 3/2003	**Ref: EW/G2002/10/02**	**Category: 2.3**
Aircraft Type and Registration:	Enstrom F-28C, G-BURI	
No & Type of Engines:	1 Lycoming HIO-360-E1AD piston engine	
Year of Manufacture:	1978	
Date & Time (UTC):	3 October 2002 at 1508 hrs	
Location:	Redhill Aerodrome, Surrey	
Type of Flight:	Training	
Persons on Board:	Crew - 2	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Damage to tail rotor blades, drive shaft and guard	
Commander's Licence:	Private Pilots Licence (Helicopters) with AFI Rating	
Commander's Age:	49 years	
Commander's Flying Experience:	1,098 hours (of which 802 were on type)	
	Last 90 days - 42 hours	
	Last 28 days - 15 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and enquiries by the AAIB	

The two pilots had been airborne for about 45 minutes on an instructional flight, which had included handling by both pilots; the instructor was in the right hand seat. The flight had involved some practice engine failures in the hover and neither pilot had noted any control problems at that time. For the final landing, the instructor took control to demonstrate a simulated engine-off landing. The weather had been good throughout the flight with a surface wind of 330°/10 kt, visibility of 10 km and broken cloud at 3,000 feet amsl.

For the demonstration, the instructor established the helicopter for a run-on landing in a north-westerly direction close to the 08/26 Helicopter Strip. After a normal flare, the instructor had difficulty raising the collective lever and G-BURI landed in a nose high attitude and with a higher than normal rate of descent, with the result that the tail rotor struck the ground.

Subsequent discussion with the instructor and examination of the helicopter indicated that there had been some interference between the right collective lever retaining pin and the surrounding trim.

The right collective lever on the Enstrom is designed to enable it to be easily installed and removed. Removal of this lever involves the extraction of a quick release retaining pin, by first lifting up its locking lever and then pulling up on the pin, and then removal of the lever itself from a socket on the collective levers torque shaft which runs across the cockpit. Replacement of the lever is the reverse, with the collective lever first inserted in to the socket, followed by the retaining pin, and pushing down of the locking lever to secure the pin in place.

On G-BURI, with the pin inserted, it was possible to freely rotate the locking lever in the horizontal plane. With the locking lever facing forward and aligned with the collective lever, there was no restriction to the movement of the collective, see Figure 1 *(jpg 248kb)*. With the locking lever rotated through 180° it would naturally rest on the top of a thin plate surrounding the cutout for the collective lever in the seat floor. In this position, the lever could be operated normally, and this was confirmed by a test on another Enstrom F-28C. On G-BURI this plate was found distorted at its aft right hand edge and this was consistent with the locking lever having been trapped between the seat floor and the plate, see Figure 2. With the locking lever in this position a soft restriction occurred as the collective lever was raised but, as more force was applied, the plate distorted, pulling its aft bolt from the underside lock nut. The lever could then be fully raised. The collective lever retaining pin was found bent, and the locating holes in the collective lever had been distorted, which meant that the pin and its locking lever were able to rotate freely. On a similar helicopter an undamaged pin was not easily rotated. The helicopter manufacturer confirmed that, even with the locking lever positioned under the seat floor plate, the movement of the collective lever would not result in a hard restriction.

Discussions with the helicopter manufacturer and interrogation of the CAA MOR database have not revealed any known similar occurrences on piston engine Enstrom helicopters that use this design of collectivelever retnention.