ACCIDENT

Aircraft Type and Registration:	Enstrom 280C Shark, G-BXEE
No & Type of Engines:	1 Lycoming HIO-360-E1AD piston engine
Year of Manufacture:	1977
Date & Time (UTC):	13 April 2006 at 1030 hrs
Location:	Sandtoft Aerodrome, Doncaster
Type of Flight:	Training
Persons on Board:	Crew - 2 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Substantial damage to tail, cabin, main rotors and tail rotor
Commander's Licence:	Commercial Pilot's Licence with Instructor Rating (Restricted)
Commander's Age:	27 years
Commander's Flying Experience:	323 hours (of which 10 were on type) Last 90 days - 118 hours Last 28 days - 61 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The instructor had insufficient power applied whilst hover taxiing resulting in over-pitching of the main rotor blades. A lack of experience on type, an absence of any low rpm warning device and an element of distraction were all contributory factors. The instructor recognised the blades were over-pitched and took appropriate recovery action by lowering the collective and attempting a run-on landing. During the landing the left skid caught the ground, rolling the aircraft onto its side.

History of the flight

The instructor was taxiing the aircraft at a height of about 5 ft above grass when he over-pitched the main rotor blades. He lowered the collective and applied full power whilst attempting to complete a run-on landing. The instructor stated that due to a lack of available tail rotor thrust, he was unable to keep the aircraft straight and despite applying full left yaw pedal, the aircraft ran along the ground to the right. The left skid then caught the ground, rolling the helicopter onto its left side and stalling the engine. Both the instructor and student were wearing four-point harnesses and were uninjured. They were able to vacate the aircraft, unaided, through the right door.

Over-pitching

Over-pitching describes the phenomenon of decreasing rotor rpm resulting in reduced total rotor thrust. It occurs when the main rotor rpm reduces such that it can no longer be recovered by applying engine power alone. Rotor drag increases as the collective pitch angle increases to compensate for reduced rpm and this tends to compound the loss of rpm. Consequently, the collective lever must be lowered in order to reduce pitch and allow the rotor rpm to recover. Similarly, loss of engine rpm causes a loss of tail rotor rpm and hence tail rotor effectiveness. It is possible that tail rotor thrust then becomes insufficient to counteract main rotor torque and so the helicopter yaws despite the application of corrective yaw pedal.

If over-pitching happens in the hover, there is normally insufficient height to restore rotor rpm and the pilot is forced to land.

Comment

The instructor had only recently qualified to fly the Enstrom 280C helicopter. All his previous flying experience had been gained on the Robinson R22 and R44 helicopter types. Both the R22 and R44 have an engine governor and correlator which ensure that the engine rpm matches the main rotor blade pitch demanded by the pilot. The Enstrom 280C has neither a governor nor a correlator. It requires the pilot to match the engine rpm to the power demanded by manually twisting the collective mounted throttle.

The R22 and R44 have a light and horn to warn of low rotor rpm. The instructor stated that the Enstrom helicopter he used to complete his conversion training was fitted with a low rotor rpm warning horn, but no light. The aircraft involved in the accident was fitted with neither.

At the time of the accident the instructor stated he was teaching the student how to hover taxi which was an additional distraction at the time he over-pitched the rotor blades.

Conclusion

The instructor had insufficient power applied resulting in over-pitching the rotor blades. A lack of experience on type, an absence of any low rpm warning device and an element of distraction were all contributory factors. The instructor recognised the blades were over-pitched and took appropriate recovery action but the left skid caught the ground, rolling the aircraft onto its side.