Gazelle HT Mk2, G-BZOS

AAIB Bulletin No: 10/2002	**Ref: EW/G2002/07/18**	**Category: 2.3**
Aircraft Type and Registration:	Gazelle HT Mk2, G-BZOS	
No & Type of Engines:	1 Turbomeca Astazou 111N2 turbine engine	
Year of Manufacture:	1974	
Date & Time (UTC):	14 July 2002 at 1636 hrs	
Location:	Gaydon, Warwicks	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 3
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Helicopter damaged beyond economic repair	
Commander's Licence:	Private Pilots Licence	
Commander's Age:	44 years	
Commander's Flying Experience:	167 hours (of which 21 were on type)	
	Last 90 days - 12 hours	
	Last 28 days - 4 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

The pilot was preparing to takeoff for the return flight from Gaydon, Warwickshire to Elstree Hertfordshire. The aircraft was parked on a grass helipad on a heading of about 350°, and an aftercast provided by the Met Office indicates that the wind was light, west to northwesterly at about 4-5 kt.

The pilot anticipated the need for right yaw pedal during the takeoff, but just after becoming airborne the helicopter yawed to the left and despite the use of more right yaw pedal, the rate of yaw increased. As the aircraft passed through 180° the rate of yaw was too high to land and the pilot became confused. He applied right cyclic to try to counter the yaw but the aircraft rolled to the right and the main rotor blades struck the ground. The helicopter came to rest on its side, having suffered extensive damage to the tail boom and cabin area, and the occupants vacated the wreckage uninjured after the pilot had shut off the fuel and electrics.

The aircraft wreckage was removed to a Gazelle maintenance organisation where a brief examination could find no fault with the helicopter.

Previous occurrences

The AAIB has reported on five similar events involving Gazelle loss of yaw control in the hover in light wind conditions, the most recent of which was reported in Bulletin 2/2002 and occurred on 3 September 2001 to Gazelle G-BXZE. The problem of apparent loss of tail rotor control in these circumstances is well known, and has been the subject of Eurocopter Service Letters and advice on the matter was included in the Military Aircraft Manual (which was the reference document for G-BZOS). The contents of the advice contained in the Service Letters and the Flight Manual was published in AAIB Bulletin 2/2002. A common factor in all the previous events reported by the AAIB was a lack of pilot experience on type, and the pilot involved in this accident cited his lack of type experience as one of the possible causal factors.

Discussion

Both the Eurocopter Service Letters and the Ministry of Defence Flight Manual emphasise that very high yaw rates can rapidly develop in the hover in light wind conditions with only very small applications of left yaw pedal. The advice from both organisations is that immediate and positive application of right pedal, up to the maximum, must be applied and held to counter the left yaw. The pilot in this accident was aware of this advice and was attempting to carry it out, but he considers that he lost control of the helicopter before he was able to do so.

There is a number of features of the Gazelle that may catch inexperienced pilots unawares. Unlike several helicopter types routinely used for training, the main rotor rotates in a clockwise direction when viewed from above and right pedal, rather than left, is therefore needed to oppose main rotor torque. A hydraulic damper restricts the rate of yaw application and pilots therefore need to apply and hold a force on the pedals to achieve maximum pedal deflection. Thirdly the fenestron-equipped Gazelle requires greater pedal deflection in some manoeuvres than would normally be required for similar manoeuvres in some other training helicopters.

Finally, whilst there is no evidence in this accident that the left seat passenger interfered with the flight controls, it was noted that potential for interference exists especially as the yaw pedal footrests are extendable. The yaw pedals, cyclic and collective are easily removed, and owners of similar types operated on a Permit to Fly should consider removing the left seat controls whenever the left seat is occupied by anyone other than a pilot qualified on type.