Dyn Aero MCR-01 Banbi, G-PGAC

AAIB Bulletin No: 1/2002	**Ref: EW/G2001/10/04**	**Category: 1.3**
INCIDENT		
Aircraft Type and Registration:	Dyn Aero MCR-01 Banbi, G-PGAC	
No & Type of Engines:	1 Rotax 912-UL piston engine	
Year of Manufacture:	1999	
Date & Time (UTC):	10 October 2001 at 1000 hrs	
Location:	Cambridge Airport	
Type of Flight:	Training	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	None	
Commander's Licence:	Private Pilots Licence	
Commander's Age:	69 years	
Commander's Flying Experience:	3,852 hours (of which 156 were on type)	
	Last 90 days - 18 hours	
	Last 28 days - 7 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and PFA Inspector's report	

History of the flight

The aircraft was a homebuilt tricycle low wing monoplane, which was operating under a Permit-to-Fly. It was equipped with a single large 'flapperon' (combined aileron and flap) on each wing.

The pilot reported that he took off at around 1030 hrs. on a short 'continuation' training flight. After a practice forced landing and some steep turns, he returned to the airfield for a normal overhead join at 2000 feet agl. He joined the downwind leg normally and selected 10 degrees of flap. He turned onto final approach at about 550 feet agl, and as he later selected additional flap at about 450 feet agl there was a 'slight jolt' and the aircraft rolled sharply to the right. The pilot applied full left stick, which stopped the roll at about 65 degrees of right bank. However, with full left stick he could not reduce the bank angle. He therefore applied power to climb away in order to sort the problem out but the increased power increased the bank angle, so he reduced the power again and the right bank angle stabilised at about 75 degrees.

He was concerned about the possibility of the aircraft stalling or spinning and therefore tried to maintain an indicated airspeed of at least 80 knots, but the aircraft was loosing height. He tried combinations of rudder, power and elevator to regain control, and also managed to call the tower controller to advise of his problem. After about 180 degrees of turn to the right he had slightly reduced the bank angle. He found that by reducing the speed to around 75kt he could reduce the bank a little more and still maintain height, which by this stage was about 100 feet agl. The descent was checked and the aircraft was turning back towards the airfield.

He had a clear approach from his position towards the runway, and required only a minimal climb to clear a hedge and a low cable, which he was able to achieve. He held height until over the airfield boundary and then reduced power, allowing the aircraft to turn left a further 20 degrees or so to align parallel with the main runway, and landed on the grass beside the runway. The landing was smooth and the aircraft stopped quickly in the long grass.

The aircraft appeared undamaged, but the left flapperon was at more than 15 degrees while the right flapperon was neutral.

Examination of the aircraft

The aircraft was subsequently examined by a Popular Flying Association (PFA) inspector, whose report was forwarded to the AAIB by the pilot. The report indicated that the flapperons were connected to an electrically driven flap mechanism, in addition to the control columns for roll control. The flap mechanism comprised two aluminium 'chariots', which travelled on guide tubes when the flaps were moved. These chariots were driven by steel screw jacks. The threads of the steel screw jacks ran directly in the aluminium chariots without any bushing. The chariots each carried bellcranks which were connected to the flapperons and to the control columns, providing the necessary mechanical mixing function.

The PFA examination found that the aluminium threads in the right hand chariot had 'stripped', allowing the flap to retract under air loads and generating a strong roll to the right which could only have been opposed by left stick or by retracting the other flap.

Pilot's report

In a very comprehensive and well documented report on the incident, the pilot stated that the whole incident lasted only some two minutes, and he did not have time to properly analyse his situation. He had not considered a flap problem when the event occurred, since there had been no obvious visual indication looking at the wing (the flap angle was small enough to be obscured by the aileron deflection), and the initial symptoms seemed more like a birdstrike or control system problem. He stated that as an ex-fighter pilot he had been in many unusual positions, but the initial high bank

with heavy sideslip was new and quite frightening when his aircraft had been so close to the ground.

Safety action

The aircraft manufacturer has introduced modified chariots with brass threaded inserts. Notification of the availability of kits of parts for retrospective modification had been received by the pilot on the evening of the day of his incident. The pilot commented that he has been advised by engineers that lubrication of the chariot and its slide tube could be particularly important due to the offset loads which it can carry.