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Air Accidents Investigation Branch

Department for Transport

AAIB Bulletin S4/2007 *SPECIAL*

ACCIDENT

Wing:	Paramania Revolution 23	
Serial Number:	N/A	
Paramotor:	H & E Paramotores R120 series (modified)	
Year of Manufacture:	2005	
Date & Time (UTC):	8 July 2007 at 1950 hrs	
Location:	Middle Barn Farm, Bexhill, Sussex	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - 1 (Fatal)	Passengers – N/A
Nature of Damage:	Substantial	
Commander's Licence:	N/A	
Commander's Age:	42 years	
Commander's Flying Experience:	5 years (paramotors)	
Information Source:	AAIB Field Investigation	

History of the flight

Several instructors, students and other pilots of the paramotor school had spent the day at the site discussing paramotor flying, conducting ground instruction and waiting for conditions to become suitable for flying. At around 1930 hrs, in conditions described as a light west-south westerly wind and good visibility, three of the more experienced pilots took off.

The pilot involved in the accident was flying a harness and wing combination belonging to the school, at which he was an instructor. He had aborted his first three attempts to launch because on each occasion the wing made an uncommanded left turn on takeoff. With the assistance of another paramotor pilot he found that the left riser had become jammed in the maillon (similar to a small 'D' ring) at the base of the left B-line. This resulted in the B-line being shorter than the other flying lines to the extent that it induced an uncommanded left turn. Together they were able to free the riser and the subsequent launch was successful.

After he had been airborne for several minutes, conducting what witnesses considered to be normal flight manoeuvres, the pilot was seen to climb to a height of approximately 1,000 ft. This indicated to the more experienced pilots that he was about to carry out some more extreme manoeuvres, such as wingovers or a "spiral". During a subsequent turn the wing was seen to collapse partially over approximately 40% of its span. Shortly afterwards the wing re-inflated.

The pilot then climbed once more and appeared to attempt a wingover to the right. This was followed almost immediately by a wingover to the left which developed into a left hand spiral. The first three turns of this spiral appeared "normal" to the witnesses, in the sense that the speed of rotation was similar to other spiral manoeuvres they had observed. However, the fourth and subsequent turns appeared to develop into a "SAT", a fast rotational manoeuvre in which the vertical axis of the wing/harness combination was horizontal and the axis of rotation appeared to be between the wing and the harness. Some witnesses considered that the paramotor had recovered partially into a spiral manoeuvre at approximately the height at which they expected the pilot to return to level flight.

At a height of approximately 150 ft several witnesses heard the engine note increase, indicating that the pilot may have applied full power. The spiral appeared to become less severe, suggesting to the witnesses that the paramotor was beginning to recover to normal flight but, almost immediately afterwards, it was clear that it had hit the ground (although approximately the last 30 ft of its descent were obscured by low hedges and trees).

The school's other instructor directed another pilot, who was airborne at the time, to fly over to the site of the impact, some distance from the main gathering. Several other witnesses made their way on foot or by car but were hampered by numerous ditches which separated the fields. Others alerted the emergency services, the first of which arrived in vehicles which were also unable to reach the site. Another pilot was able to identify the location using a hand held GPS and directed the air ambulance to within a short distance of the injured pilot.

The pilot was attended at the scene by paramedics then flown to hospital. He remained unconscious throughout and succumbed to his injuries two days later.

Integrity of Paramotor Structures

The initial investigation of this fatal accident has revealed

that at least one in-flight component failure occurred to the metal structure of the paramotor.

Examination of components from several other paramotors has revealed distortion or damage to the horizontal arms, parts of the arms, or fittings attached to and applying loading to the arms. Such distortion indicates that these components have been loaded close to their failure stress levels.

The arms examined so far vary considerably in design and incorporate a range of different fittings. The AAIB is concerned that no design criteria appear to exist to determine the strength of these items and that there is no overall control of the design and geometry of fittings. Given that each harness may be used with a variety of wings, each with different lift capabilities, and that the mass of the pilot and machine is variable, many arms and fittings in use may not be sufficiently strong to sustain the loads experienced in certain manoeuvres. Without further information, the AAIB regards this as a potential flight safety hazard.

Accordingly, all pilots are advised to refrain from extreme manoeuvres until the structural integrity of these machines is ascertained. Owners and representative bodies are strongly advised to establish the level of testing carried out by individual manufacturers of the structures of their machines. Load levels must be related to the lift capabilities of the particular wings in use and the maximum suspended weight of the harness, power unit and pilot. Reliable estimates of the maximum normal acceleration experienced in particular manoeuvres must be established to enable these loadings to be properly factored. In addition, the effects on strength of any fittings which alter the loading (either directly or by creating offset geometry) of the structure to which they are attached must be established.

Only when precise reserve factors have been established for individual harness/wing combinations carrying realistic suspended masses, at load factors appropriate to the manoeuvres to be carried out, can these aircraft be considered to be structurally safe.

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