Europa, G-BVLH

AAIB Bulletin No: 7/2003	Ref: EW/G2003/03/05	Category: 1.3
Aircraft Type and Registration:	Europa, G-BVLH	
No & Type of Engines:	1 Rotax 912-UL piston engine	
Year of Manufacture:	2001	
Date & Time (UTC):	3 March 2003 at 0920 hrs	
Location:	Brunton Airfield, Northumberland	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Aircraft broken into two pieces	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	54 years	
Commander's Flying Experience:	18,515 hours (of which 126 were on type)	
	Last 90 days - 158 hours	
	Last 28 days - 32 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot plus AAIB examination of rudder cables	

History of flight

The pilot had completed his normal pre-flight procedures and was lined up for departure on the centre of Runway 26 at Brunton. The metalled runway surface was dry, 46 metres wide, in good condition and with no visible debris. To the left of the runway and running parallel to its edge was a six-strand, wire fence supported by wooden posts. The weather was good with the surface wind calm and CAVOK.

During the takeoff the pilot made a smooth and continuous application of power and the aircraft accelerated along the runway with no deviation to the left or right. The tail wheel cleared the runway as normal and as the aircraft became light on the main landing gear, the pilot glanced down at the ASI and saw an airspeed of 40 KIAS. At that moment the aircraft veered to the left and the pilot was not able to prevent it departing the left side of the runway. The aircraft struck the fence with its left wing and spun around to the left, continuing through the fence backwards and to the right. When the aircraft had stopped, the pilot selected the fuel off and vacated it through the normal door on the port side.

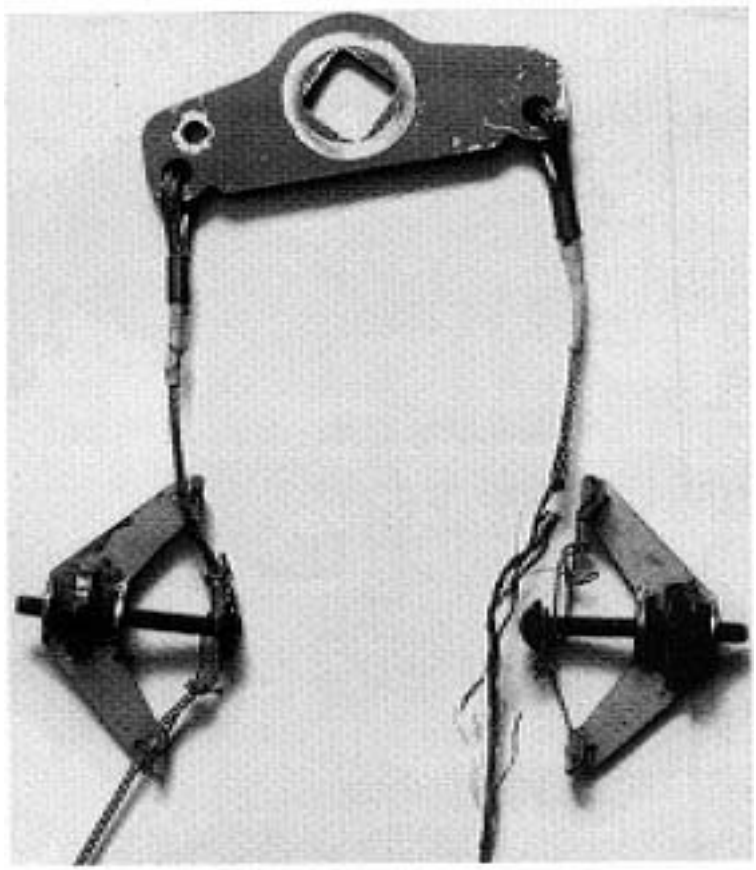
Cable damage

After the accident, the pilot checked the controls and found all except the rudder cables to be serviceable and correctly rigged. The rudder cables, which had shorteners (length adjusting devices) fitted at their aft ends near to the rudder operating arm, were correctly attached to the pedals at the

forward end. The right cable had failed completely at the cable shortener and the left cable had partially failed in a similar location.

Metallurgical examination

The cables, operating arm and shorteners were sent to the AAIB for examination. The metallurgical examination showed that all the strand failures had been the result of tensile failure, consistent with mechanical overload, and all had occurred at positions related to where the cables had been in contact with the shortener.



Rudder operating arm with cables and shorteners

Both cables were tested for tensile strength, both with and without the shorteners in place. These tests showed that both cables had an ultimate strength greater than 460 kgf but that the presence of the cable shorteners reduced the effective strength by about 20%. The minimum strength of the wire cable, guaranteed by the manufacturer, was 380 kgf.

Analysis

The pilot had carried out four uneventful takeoffs in the previous two days, one in a strong crosswind, and he was not aware of any change in his handling technique. Despite trying to analyse the accident he could not identify any specific event or action which might have led to it. The pilot thought that having left the runway, the main wheel might have dug into a rut at the edge of the field which resulted in the engine compartment breaking off to the right caused by the sideways force on the

extended main landing gear. Given the strength of the cables, it is likely that the damaged right cable failed as the aircraft structure disrupted.

The shorteners used in this instance were of proprietary manufacture and had been acquired by the owner when building the aircraft. This type of shortener has the cable passing over sharp plate edges which results in a marked reduction in the effective strength of the cable. The aircraft manufacturer recommends a different type of shortener in which the cable passes round bolts rather than over sharp edges.