

ACCIDENT

Aircraft Type and Registration:	Diamond Aircraft Industries DA20-C1, G-NIKK	
No & Type of Engines:	1 Continental Motors IO-240-B piston engine	
Year of Manufacture:	2000	
Date & Time (UTC):	5 June 2006 at 1255 hrs	
Location:	Redhill Aerodrome, Surrey	
Type of Flight:	Training	
Persons on Board:	Crew - 2	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Fuselage fractured, propeller damage, engine shock loaded	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	68 years	
Commander's Flying Experience:	16,000 hours (of which 250 were on type) Last 90 days - 14 hours Last 28 days - 11 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot, examination by AAIB and a metallurgist	

Synopsis

Following a normal approach for a 'touch-and-go' landing on a grass runway the aircraft touched down smoothly on its main wheels, followed by the nosewheel gently lowering onto the runway. Engine power was applied and the flaps selected to their takeoff position when a bang was heard and the aircraft stopped violently, coming to rest in a nose-down position. Examination revealed that the nose landing gear leg had failed in overload following severe plastic deformation, consistent with a high upward vertical load being applied to the nosewheel. It was not possible to determine the number of flights between the deformation occurring and the final failure.

History of the flight

Following a normal approach for a 'touch-and-go' landing on a grass runway the aircraft touched down smoothly on its main wheels, followed by the nosewheel gently lowering onto the runway. Engine power was applied and the flaps selected to their takeoff position when a bang was heard and the aircraft stopped violently, coming to rest in a nose-down position. The fuel and electrical master switches were selected off and the crew vacated the aircraft normally.

Engineering examination

The nose landing gear leg had failed in the area immediately to the rear of the weld that attached the nosewheel castoring pivot to the leg. Metallurgical

examination showed that there had been severe plastic deformation in the area of the failure and that the deformation had induced high residual tension stresses. The deformation was consistent with a high upward vertical load being applied to the nosewheel. Following the deformation, cyclic loading caused very high-stress low-cycle fatigue cracking to initiate and propagate,

which progressively reduced the strength of the strut until it fractured under overload conditions. There were no 'beach' or event markers found on the fracture surface, indicating that the fatigue crack propagation took place over one landing event. It was not possible to determine the number of flights between the deformation occurring and the initiation of the fatigue crack.