ACCIDENT

Aircraft Type and Registration:	Lancair 320, G-CBAF
No & Type of Engines:	1 Lycoming IO-320-B1A piston engine
Category:	1.3
Year of Manufacture:	2002
Date & Time (UTC):	11 June 2005 at 1652 hrs
Location:	Lydd Airport, Kent
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Failed nose wheel attachment, damaged lower end of nose landing gear strut, shattered propeller and engine shock loaded
Commander's Licence:	Private Pilot's Licence
Commander's Age:	51 years
Commander's Flying Experience:	298 hours (of which 16 were on type) Last 90 days - 18 hours Last 28 days - 9 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and metallurgical examination

History of the flight

The aircraft had been purchased by the owners about three months prior to the accident and the majority of their flying in it had been with an instructor. Prior to the accident flight the pilot/co-owner carried out a pre-flight check of the aircraft but did not notice anything unusual with the landing gears. Following a successful local flight in good weather conditions, the pilot made a normal approach to Runway 03 which has an asphalt surface. The surface wind at the time was 030º/07 kt. In the flare with the speed reducing below 80 kt, the main wheels touched down on the runway followed a few seconds later by the nose wheel. The pilot assessed that the landing was very smooth and with no drift (it was described by more than one person as "a real greaser"). About one second after the nose wheel touched down, the nose tipped down and the aircraft rapidly came to a halt. As the aircraft's nose tipped down, the propeller tips struck the runway which stopped the engine.

Other information

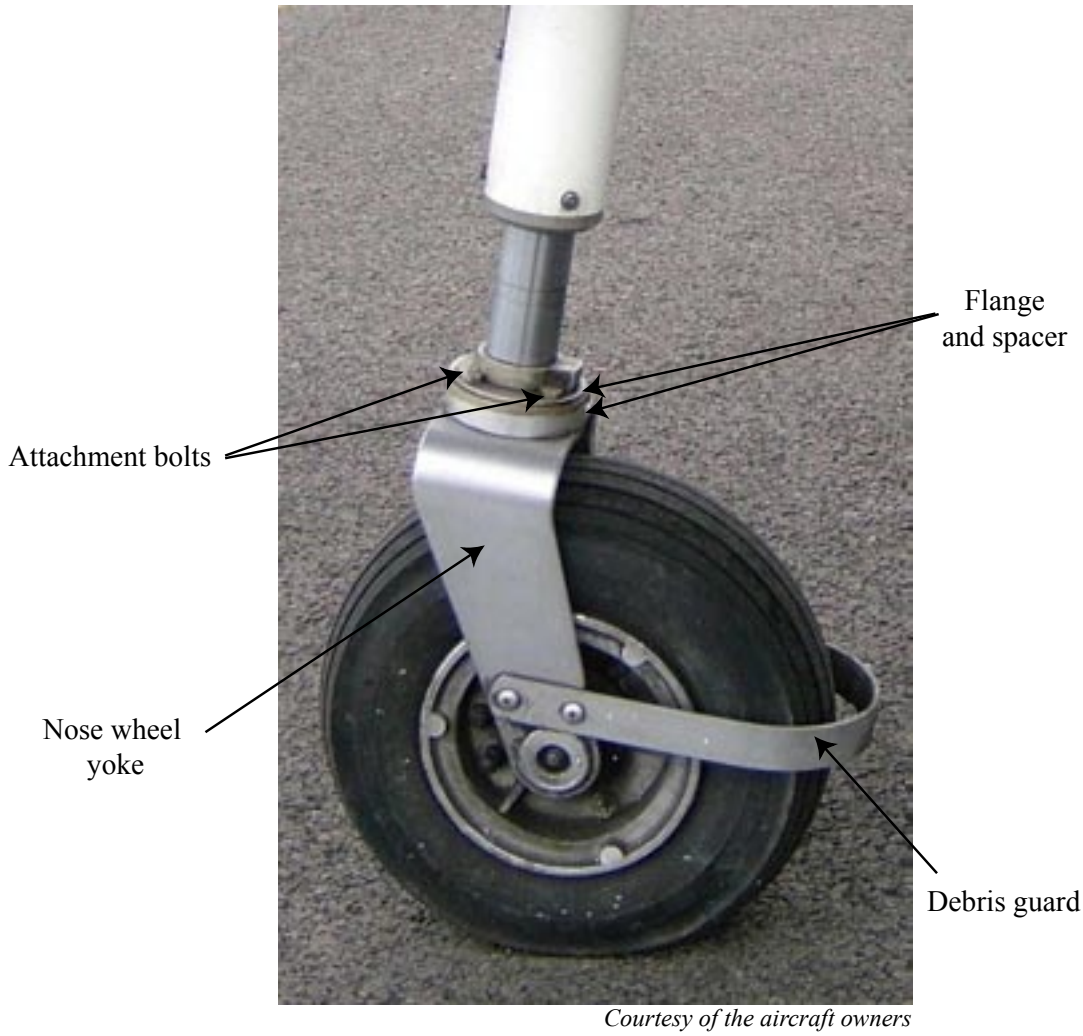
There were two eye witnesses, both of whom had flown in the aircraft on the previous two flights. Their view of

the accident was very similar to that of the pilot except that they estimated that the nose wheel detached from the aircraft some 300 m after it touched down on the runway.

Engineering examination

Examination of the aircraft showed that the nose wheel mounted in its attachment yoke had become detached from the nose leg (Figure 1). All four bolts that attached the yoke to the nose leg had remained located within the flange and spacer assembly that was fitted at the bottom of the nose leg. Three of the four stiff nuts from the attachment bolts were found scattered between the aircraft and the runway threshold.

All these items were taken to a metallurgical laboratory for examination. It was seen that the debris guard had been deformed to an extent that allowed it to come into contact with the tyre, stopping the wheel from rotating. The tyre was in a very good condition with no evidence of scuffing which would suggest that the wheel was free to rotate at touchdown and that the damage to the debris guard had occurred after the wheel had detached from the aircraft. Evidence of mechanical damage was seen at the forward edge of the nose wheel attachment yoke which is consistent with impact damage with the runway after the wheel had become detached.



Courtesy of the aircraft owners

Figure 1

Picture of the nose landing gear

The two rear attachment bolt holes in the nose wheel yoke were deformed in a rearward direction. The two forward attachment bolt holes showed a very minor degree of deformation and some damage in the forward faces of the holes. This indicates that the two forward attachment bolts were extracted in a mainly vertical direction while the yoke pivoted rearwards about the rear attachment bolt line. This would cause the ends of the forward attachment bolts to contact the forward faces of their holes in the yoke and the rear attachment bolts to bend within their holes causing the hole deformation.

The threaded ends of all four attachment bolts had extensive surface abrasion and evidence of heat tinting indicating that some frictional heating had occurred, consistent with contact with the runway during landing. This abrasion destroyed any evidence of a fatigue failure if there had been one. The two rear attachment bolts showed evidence of bending consistent with the pivoting of the nose wheel yoke along the rear bolt line.

Only three of the four attachment bolt nuts were recovered. All three nuts showed very good evidence of thread stripping which is indicative of the nuts being pulled off the attachment bolts during tensile loading. Because the fourth nut was not recovered, it is possible that it may not have failed in a similar manner.

Routine landing gear tests and inspections

The previous owner of G-CBAF reported that the aircraft had undergone a thorough pre-sale inspection carried out by an engineer. This inspection included retraction tests and examination of the nose landing gear to establish conformity with a manufacturer's directive concerning security of the strut flange. The flange was of the latest modified type. The previous owner had completed five more landings before parting with the aircraft. When the ownership changed the aircraft had accrued about 60 flying hours; at the time of the accident it had accrued some 93 flying hours.

Discussion

It is possible that one of the attachment bolts failed in fatigue and that the bolt tail, with the nut still attached, separated prior to the detachment of the nose wheel assembly. However, if this was the case and one of the attachment bolts had failed prior to the accident landing, it seems unlikely that the nose wheel assembly would detach in the way it did because on landing the joint between the nose wheel yoke and the leg is put into compression. Failure of at least three of the attachment bolts had occurred due to tensile loading causing the threads in the nuts to strip. For this to occur, in a manner that would cause pivoting about the rear attachment bolt line, the aircraft has to be moving forward while the nose wheel is impeded, such as by striking a raised lip or pothole. This may have happened at some time prior to the accident flight and possibly before the owners purchased their aircraft from its previous owner. The wheel could have struck an object causing it to bend, deforming or even stripping the forward attachment bolt nuts. Then on the accident landing the wheel may not have been co-linear to the strut causing it to buckle and detach.

ACCIDENT

Aircraft Type and Registration:	MCR-01 Club, G-DGHI
No & Type of Engines:	1 Rotax 912 ULS piston engine
Category:	1.3
Year of Manufacture:	2004
Date & Time (UTC):	17 June 2005 at 1745 hrs
Location:	Fridd Farm, Ashford, Kent
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Landing gear, propeller and under-fuselage damaged
Commander's Licence:	Private Pilot's Licence
Commander's Age:	59 years
Commander's Flying Experience:	577 hours (of which 30 were on type) Last 90 days - 16 hours Last 28 days - 8 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

The pilot had intended to fly to Le Touquet with a passenger. As this was to be his first flight across the channel in this aircraft he decided to perform several circuits, on the day prior to the planned flight, in order to check that it was fully serviceable. Three such circuits were carried-out, stopping after each one to perform magneto-drop and temperature and pressure checks, which all proved satisfactory. After a break of about an hour he checked the fuel contents with a calibrated dip-stick, confirming that he had 70 litres on-board, and then carried out the full pre-flight checks before lining-up for takeoff on the grass strip with the electric fuel pump switched on. All of the required checks prior to take off were completed but, at approximately 150-200 ft, the engine 'coughed' and stopped suddenly.

The pilot realised that he could not land straight ahead since the field in front had numerous obstructions, including sheep and there were similar problems to the right, so he decided to land to the left, in a field of oil seed rape. Upon touchdown the nose landing gear leg folded upwards and back but the aircraft stayed upright and, after switching off the electrical master switch and fuel cock, the pilot exited the aircraft normally. Injury was confined to minor scratches on both hands.

G-DGHI had been built by its owner/pilot from a 'fast-build' kit supplied by Dyn-Aero of France. It had flown about 31 hours at the time of the accident. The owner decided that the aircraft should be repaired by the main agent for Dyn-Aero in France and it was despatched