Tri R-Kis, G-OKMA

AAIB Bulletin No: 4/2003	**Ref: EW/G2002/09/08**	**Category: 1.3**
Aircraft Type and Registration:	Tri R-Kis, G-OKMA	
No & Type of Engines:	1 Teledyne Continental IO-240 piston engine	
Year of Manufacture:	1994	
Date & Time (UTC):	2 September 2002 at 1600 hrs	
Location:	Coventry Airport	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Propeller, spinner, nosewheel, nose leg, lower engine cowling and bulkhead	
Commander's Licence:	Private Pilots Licence	
Commander's Age:	66 years	
Commander's Flying Experience:	1,765 hours (of which 11 were on type)	
	Last 90 days - 13 hours	
	Last 28 days - 11 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and metallurgical examination of the failed nose leg	

The aircraft landed on Runway 05 at Coventry, at the end of a flight from Shoreham. The pilot reported that he flew a power off approach and touched down on the main wheels only, holding the nosewheel off the ground. The nosewheel then touched the runway, lifted off slightly and then touched down again, with the main wheels remaining in contact with the runway throughout this period. About three to five seconds later, the pilot became aware that the nose was dropping and the propeller touched the runway and broke up.

The pilot believed that he must have switched off the engine at this point. The aircraft continued to slide on its nose and the pilot recollected that, by the time it had stopped, he had also switched off

the fuel. He then switched off the electrical master switch before he and the passenger exited the aircraft.

Examination of the runway surface indicated that the nosewheel had separated shortly after the point of estimated touchdown, followed by a series of propeller strike marks. A gouge mark in the runway, approximately 40 centimetres long, was then created by the noseleg. Shortly after this, marks created by the lower cowling then extended for approximately 150 metres to the point where the aircraft came to rest. The nose leg was found to have fractured at both the upper and lower ends.

The noseleg is a steel unit of reinforced teardrop section inclined forward at 45 degrees to the horizontal, with the wheel assembly castoring about a vertically orientated tubular lower section. The main section of the leg is shrouded in a composite sheath.

The composite sheathing of the steel leg was absent when it was received at the AAIB. The point at which this sheathing was removed was not known. The upper leg failure had occurred in the region of the point where a lateral tube passed through, and was welded to, the leg. Microscopic examination indicated that the upper failure was entirely ductile in nature. Some evidence of gas pores, characteristic of weld porosity, was evident in the starboard side of the fracture in the weld area through which the fracture face passed.

The lower fracture was positioned just below the 45 degree welded joint, where the main leg was attached to the tubular wheel pivot/mounting section. Though most of the fracture was clearly ductile in nature, having progressed circumferentially around the section, a short length ran longitudinally. Within the longitudinal section was an area of staining, which had apparently resulted from corrosion, and had extended from the outer surface to a depth of approximately half of the wall thickness.

The detail of the underlying surface condition, beneath the corrosive staining, did not survive the cleaning process that was required before carrying out Scanning Electron Microscopic (SEM) examination. The area of the longitudinal fracture was found, however, to have different characteristics from the remainder of the failure surface. It appeared to have suffered a more complex failure mechanism that was difficult to define. The presence of the corrosion staining, however, indicated that a small pre-existing crack had been present. The location of the crack did not suggest that it had been caused by fatigue.

SEM examination of the upper fracture surface confirmed that it was ductile and, although the failure occurred through the weld at the porous area, it was not thought that the overall reduction in strength was very great.

It was concluded that the lower failure occurred first, which allowed the leg to come into contact with the runway, thus applying a high bending moment to the leg and led to a ductile failure near the upper end. The initial failure propagated from a pre-existing crack. The reason for the presence of the crack is not clear. However, as the lower wheel attachment tube was of slightly oval section where it joined the main leg, it is possible that the crack was inadvertently created during manufacture, as the tube was being formed to the oval shape.