AAIB Bulletin No: 8/95 **Ref: EW/G95/04/24** **Category: 1.3**

Aircraft Type and Registration:	Pulsar 582, G-BTDR
No & Type of Engines:	1 Rotax 582 piston engine
Year of Manufacture:	1995
Date & Time (UTC):	29 April 1995 at 1615 hrs
Location:	North Weald Aerodrome, Essex
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Damage to nose landing gear trailing fork and wheel spat
Commander's Licence:	Private Pilot's Licence with IMC and Night Ratings
Commander's Age:	60 years
Commander's Flying Experience:	1,250 hours (of which 1 was on type) Last 90 days - 15 hours Last 28 days - 8 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

The aircraft was being flown on its initial flight tests by a nominated test pilot, using Runway 13 at North Weald Aerodrome. This runway is 916 metres long, with an asphalt surface. The Pulsar is a light monoplane, principally of composite construction, built under the auspices of the PFA (Popular Flying Association) from kits and plans supplied from the USA. The aircraft has a castoring-type nosewheel and this nosewheel is mounted within a simple fork, castoring about a vertical bolt attached to the nose leg. This vertical bolt is fitted with 'Belleville' washers, where the dished conical design of the washer allows for adjustment of the frictional force resisting the castoring motion of the nosewheel.

The first flight was uneventful until, on the downwind leg of the circuit, the pilot experienced difficulties with the airspeed indicator. The approach to land was, therefore, flown at a conservatively high speed and the excess speed was allowed to dissipate in an extended 'flare'. The pilot states that he did not feel anything unusual during the landing roll and, at a distance, the spectators did not notice distinctive 'shimmy' of the nose landing gear. After the flight the airspeed pitot-static system was adjusted and a general airframe inspection carried out; the presence of the nosewheel spat did, however, preclude a detailed examination of the nosewheel and axle.

The second flight was also uneventful, until the landing. The pilot and spectators agree that the touchdown was on the mainwheels and appeared normal; as the speed decreased, the nose was lowered gently and the nosewheel ran for a short distance. At about 20 to 30 kt, however, the nosewheel became detached, the nose lowered onto the trailing fork and the aeroplane skidded to a halt in some 30 yards, in a straight line. Again, the pilot did not detect any unusual vibration during the landing roll but one spectator believed that he saw some form of oscillation of the nose landing gear.

On examination, it was found that one arm of the castoring fork had failed, releasing the nosewheel. G-BTDR had been built over a four-year period and the original hardware for the nose landing gear had included a thin wall steel tube as the axle, secured by split pins for locating the axle within the aluminium castoring fork. The most likely failure mechanism appeared, therefore, to be that the axle had migrated out of one arm of the fork, following failure of the split pin on that side. Since the time of the accident, the builder and owner of G-BTDR has received new hardware from the kit manufacturer; the axle is now of solid aluminium, the split pins have been replaced by bolts and the wheel spat allows easier inspection of these bolts. The builder also notes that the specified figure for the torsional friction in the castoring bolt assembly has been approximately doubled.