Piper PA-28R-200, G-BOJH

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Aircraft Type and Registration:	Piper PA-28R-200, G-BOJH
No & Type of Engines:	1 Lycoming IO-360-C1C piston engine
Year of Manufacture:	1972
Date & Time (UTC):	31 January 1998 at 1250 hrs
Location:	Perth (Scone) Airport, Scotland
Type of Flight:	Private
Persons on Board:	Crew - 1 - Passengers - 3
Injuries:	Crew - None - Passengers - None
Nature of Damage:	Damage to propeller, engine cowl and mounts, nose landing gear
Commander's Licence:	Private Pilot's Licence with IMC and Night Ratings
Commander's Age:	47 years
Commander's Flying Experience:	480 hours (of which 38 were on type) Last 90 days - 48 hours Last 28 days - 18 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

After a normal take off from Glasgow Airport, the landing gear was selected up but the in-transit light remained illuminated. Reselecting the landing gear down produced two mainwheel green lights but none for the nose gear. The pilot tried the flight manual emergency lowering procedures but to no avail.

He decided to divert to Perth because he knew it had a grass runway and engineering facilities. Upon arrival he performed a low fly-past and an engineer confirmed that the nose landing gear had only partly emerged from the bay. The pilot circled the airfield until the emergency services arrived and then performed six practice approaches and go-arounds, taking the decision to land on the main wheels only. He briefed his passengers on the emergency and evacuation procedures and on finals

he lean-cut the engine, switched-off the magnetoes and the master switch. After touchdown he held the nose up until the point at which the elevators became ineffective and the nose dropped. After a short ground slide he and the passengers evacuated the aircraft without difficulty.

Examination showed that the nose leg had been prevented from extending because of a 'hang-up' involving the steering centring mechanism (see figure). The engineer who recovered the aircraft reported that the nosewheel was canted to one side. As the nose landing gear retracts, a roller mounted from the support structure enters a channel section guide fixed to the steering arm on the top of the leg. The guide is flared to engage the roller at any angle within the nosewheel steering range as retraction commences but thereafter the guide narrows down so that the nosewheel is completely centred. It was clear that the roller had become displaced from the guide and had run down the outside of the channel during gear extension until the flare on the guide prevented further movement. The action of forcing the leg down during recovery had distorted the guide and the roller mount.

In the retracted position, engagement of the roller in the guide appears only partial. The diagram (adapted from the Service Manual) shows the roller close to the end of the guide but the maintenance organisation report that, even in a correctly rigged system, the roller is partially visible beyond the end of the guide. Any further movement of the leg towards the 'up' position could cause the roller to move out of engagement with the guide. However, this process would not explain the failure of the landing gear to retract in the first place and it remains a possibility that the roller failed to correctly engage the guide on landing gear retraction at Glasgow. Unfortunately, recovery damage and the repair process meant that it was not established whether the pre-accident rigging was correct, but evidently no other factor, such as component failure or excessive wear was found.

The pilot reported that, shortly before the accident, he had asked the maintenance organistion to check out the nosewheel steering as he had found that it was stiff when turning right. They found that some of the grease had hardened and generally the nosewheel steering system was 'dry' and so lubricated it as appropriate. Whether this stiffness was in any way related to the subsequent sequence of events which led to the nose gear jamming is not known, but it is difficult to rationalise a connection.