Piper PA-24-250, G-ASEO, 28 May 1997

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Aircraft Type and Registration:	Piper PA-24-250, G-ASEO
No & Type of Engines:	1 Lycoming O-540-A1D5 piston engine
Year of Manufacture:	1962
Date & Time (UTC):	28 May 1997 at 2000 hrs
Location:	Hermitage Airstrip, Sherborne, Dorset
Type of Flight:	Private
Persons on Board:	Crew - 1 - Passengers - None
Injuries:	Crew - None - Passengers - N/A
Nature of Damage:	Nose landing gear broken off, landing gear operating mechanism, propeller blades and fuselage undersurface damaged
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	48 years
Commander's Flying Experience:	10,482 hours (of which 150 were on type)
	Last 90 days - 60 hours
	Last 28 days - 21 hours
Information Source:	AAIB Field Investigation

The aircraft was on a flight from Southampton Airport to HermitageAirstrip, a private farm strip 5 nm south of Sherborne, nearthe pilot's home. The wind was very light, from the east, visibilitywas good and there was no cloud. Hermitage has a grass runway,oriented 08/26, with an LDA of 450 m in either direction. The runway is described as undulating, high at the east end andthe centre and low at the west end. The pilot described it asrising sharply from the 08 threshold to a crest approximatelyhalf way down the strip.

When the aircraft arrived over the airstrip the sun was low andbright in the western sky and the pilot elected to land on Runway 08. He executed a normal approach, curved to the left to avoid hightrees, intending to touchdown as early as possible on the relativelyshort strip. He had once previously landed on Runway 08,but on that occasion had touched down further along the strip,beyond a path crossing the strip a little distance from the startof the runway.

He selected the landing gear down, and confirmed that the greengear locked down light was lit. Conscious that the initial partof the runway rose quite steeply, the pilot flared the aircraftat the same time as he yawed it to straighten the approach. Awitness near the touchdown point reported that the aircraft executeda tight circuit and was in a right skid with a flat pitch attituderelative to the ground as it touched down, very near to the startof the runway. The pilot believed that the left main landinggear touched down first, not very hard, and he immediately becameaware that it was collapsing, but too late to prevent a touchdownon the right main landing gear, which also collapsed. He attemptedto hold the nose up as long as possible; as it dropped to theground he turned the fuel tank selector off. The aircraft yawedto the right but came to rest on the runway, on the uphill portion,and the pilot, who was uninjured, vacated the aircraft withoutdifficulty after completing the checks. There was no fire.

A small fuel leak from the left wing was noted as the aircraftsat yawed across the runway and thus with its right wing low. The main and auxiliary fuel tank in each wing had been filledbefore departing from Southampton and the left main tank had beenused to supply the engine during the 30 minute flight. Themaintenance organisation that recovered the aircraft believedthat the leakage was likely to have been from the vent of theleft auxiliary tank, which remained full.

The pilot reported that there had been no bump or jolt of anymagnitude on touchdown and that he had been surprised at the landinggear collapse. However, on subsequent inspection he consideredthe ground to be rough at the point where he had touched downand believed that this had caused overload failure of the landinggear.

It was reported that marks of the mainwheels running on the runwaysurface were apparent, without any signs of heavy initial contactbut with the track narrowing with distance along the runway, consistentwith the main landing gears progressively retracting inwards. No nosewheel contact marks or tracks were evident.

Examination of the aircraft by a maintenance organisation andof some components by AAIB found no signs of pre-accident anomalywith the landing gear system, although its rigging could not bechecked. System operation is by means of an electric actuatorin the fuselage that is connected to the downlock linkage on eachleg, via a bowden type cable in the case of each main leg andvia a push-pull rod for the nose leg. Each downlock is formedby a two-part overcentre linkage that, with the gear locked down,is maintained overcentred by springs and by the operating mechanism. The main legs retract inwards and the nose leg retracts aft. The piston portion of the nose landing gear leg had bent throughabout 30° and snapped off in a manner consistent with grossrearward overload on the wheel. The wheel and broken-off partof the leg were recovered from the nose gear bay. Both main legswere found partially retracted, with severe overload damage tothe operating mechanism. This consisted of compressive bucklingfailure of the right main leg operating cable conduit and displacementof the actuator, both consistent with overload applied by landinggear legs forcibly retracting under the influence of ground reactionloads from an unlocked condition. However, no damage was evidentto the mounting structure or the downlock mechanism of any ofthe three landing gears.

The evidence suggested that the nose gear had fractured on touchdownwhen in a downlocked condition. It appeared likely that the nosewheeland broken-off portion of leg, on entering the nose gear bay,had contacted the downlock mechanism and unlocked the nose gear,allowing ground reaction loads on the remaining part of the legto be transmitted to the actuator by the operating rod, therebydisplacing the actuator and unlocking the main legs.