Cessna 182A, D-EEPY

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Aircraft Type and Registration:	Cessna 182A, D-EEPY
No & Type of Engines:	1 Lycoming O-540-L3C5D piston engine
Year of Manufacture:	1979
Date & Time (UTC):	11 June 1999 at 1150 hrs
Location:	Londonderry Airfield, N Ireland
Type of Flight:	Private
Persons on Board:	Crew - 1 - Passengers - 1
Injuries:	Crew - None - Passengers - None
Nature of Damage:	Damage to nose-wheel area and propeller
Commander's Licence:	Private Pilot's Licence
Commander's Age:	54 years
Commander's Flying Experience:	1,064 hours (of which 12 were on type) Last 90 days - 31 hours Last 28 days - 30 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot, telephone conversations and documentation supplied by repair agency

The pilot reported that following a flight from Galway to Londonderry, at the start of the approach, the aircraft was slowed to 120 kt and the hydraulically powered landing gear was selected down. The 'nose-wheel down and locked' green light failed to illuminate. This was reported to the tower.

The pilot then retracted the gear and lowered it again; retraction appeared normal but once again, after selecting gear down, the nosewheel green light failed to illuminate. The pilot then carried out the manual gear extension procedure using the 'emergency hand pump'. The main gear extended immediately but the operating handle then became stiff to operate in the same way as normally occurs at the end of manual extension. The nosewheel light, however, still failed to illuminate. The pilot attempted to continue pumping for about 20 strokes; this was still not successful and he feared that the force he was using was likely to break the hand pump lever.

The pilot then exchanged the nosewheel bulb for a known serviceable bulb; still the nose-wheel green light failed to illuminate. He informed the tower and was cleared for a slow fly-past. After two such passes, the tower personnel were uncertain of the status of the nose leg.

It was therefore arranged that an army helicopter would fly alongside the aircraft to permit the crew to obtain a closer view. After viewing the leg, the helicopter crew reported that it appeared to be correctly extended.

Clearance to land was given after emergency personnel had been positioned appropriately. The pilot then landed carefully on the main-wheels, at the lowest possible speed. Although maximum aft pressure was applied on the control column, as the aircraft slowed the nose continued to descend until a steep nose down angle was achieved. Deceleration was not excessive. The two occupants evacuated via the normal doors immediately the aircraft came to a halt.

It was found on recovery of the aircraft that the piston rod of the nose-leg operating jack had been prevented from achieving full travel in the gear-down sense. (See Figure 1) The inner ends of the two 'lock pins' (upon which the down-lock hooks engage when the gear is locked down) had migrated inboard within their mounting lugs on the 'bearing end'. This had resulted in the 'nut' on the forward end of the 'piston rod', which passes between the two lugs, fouling the lock pins protruding ends. Further examination revealed that both lock pins had fractured approximately in the plane of their circumferential groove.

The lock pins are normally positioned such that the groove is within the profile of the lugs of the bearing end. The groove permits locating pins passing through vertically orientated drillings in the lugs to locate the lock pins in position. Failure of the lock pins in the plane of the groove allowed their inner ends to migrate a short distance out of the lugs, hence preventing full piston rod movement by fouling the nut positioned on the rod end.

The repair agency noted that the replacement bearing end, lock pins and locating pins used during the repair were of a different design to the originals. In the new design the lock pins were of constant diameter without the groove but with locating holes drilled through their centres at right angles to their axes. Corresponding holes in the lugs of the bearing end were positioned such that the locating pins were able to pass vertically through the lugs and the lock pins, thus securing the latter in the former. The stress concentrations created by the groove in the original down-lock pins were thus largely eliminated in the new design.