

# Piper PA-32RT-300, G-NROY, 29 October 2000

**AAIB Bulletin No: 4/2001 Ref: EW/G2000/10/16 Category: 1.3**

**Aircraft Type and Registration:** Piper PA-32RT-300, G-NROY

**No & Type of Engines:** 1 Lycoming IO-540-K1G5D piston engine

**Year of Manufacture:** 1979

**Date & Time (UTC):** 29 October 2000 at 1714 hrs

**Location:** Norwich Airport

**Type of Flight:** Private

**Persons on Board:** Crew - 1 - Passengers - 6 (incl 2 children)

**Injuries:** Crew - None - Passengers - None

**Nature of Damage:** Damage to nosewheel, propeller and left wing

**Commander's Licence:** Private Pilot's Licence

**Commander's Age:** 60 years

**Commander's Flying Experience:** 2,351 hours (of which 2,116 were on type)  
Last 90 days - 18 hours  
Last 28 days - 10 hours

**Information Source:** Aircraft Accident Report Form submitted by the pilot and additional AAIB inquiries

## History of the flight

During the approach to land on Runway 27 at Norwich Airport, following a return flight to Le Touquet, the pilot observed that the red warning light for the nose landing gear was 'flickering', indicating an unsafe condition, although the normal 'three green lights' indication had previously been obtained following the landing gear DOWN selection. The pilot therefore decided to go-around for another approach. However, due to the crosswind component on Runway 27, the next approach was made to Runway 22. The landing gear was again selected DOWN, but as the aircraft touched down the nose appeared to lower excessively and so another go-around was initiated, although the pilot suspected that the propeller may have contacted the runway. After the aircraft became airborne again, the pilot found that the landing gear would not retract. He therefore attempted to lock the gear down by means of the emergency system; this involved reducing airspeed and repeatedly pulling the nose up sharply in order to encourage the nose gear to enter downlock during the 'g' applications. However he was unable to obtain a green light indication for the nose gear. The aircraft continued to orbit for approximately 15 minutes in 'bumpy' weather conditions, whilst the emergency services positioned on the airport. During this time the weather

was deteriorating rapidly and the light was fading. The wind was reported as 200° at 14 kt, with gusts of 28 kt.

The pilot then made his final approach to Runway 22 without a green indication for the nose gear and after touchdown the nose gear collapsed, shortly followed by the collapse of the left main landing gear. The aircraft came to rest on the grass to the left of the runway, with no injuries to the occupants.

### **Landing gear system**

This aircraft type is equipped with a retractable landing gear, which is hydraulically operated by an electrically powered reversible pump. In the event of an electrical or hydraulic failure, an emergency extension lever is provided which manually releases hydraulic pressure to allow the landing gear to free fall. Two springs on the nose gear provide assistance in overcoming the air loads, although according to the 'Emergency Procedures' section of the Flight Manual the aircraft must be flown at an airspeed below 87 kt for this to be achieved.

### **Examination of the landing gear system**

It was found that the hydraulic pump electric motor was inoperative due, according to the overhaul agency, to the brushes having worn out. The pump motor manufacturer specifies a 500 flying hour inspection period for this motor. The last inspection of this motor had been conducted in December 1997 at 2,745 aircraft hours; the aircraft had then flown an additional 316 hours up to the time of this accident.

The engineer who normally looked after the aircraft subsequently noted that the nose gear downlock microswitch was slightly mis-rigged so that its associated red 'unsafe' light in the cockpit illuminated if firm hand pressure was applied to the downlock linkage, although the gear remained locked down.

### **Discussion**

The reported slight mis-rigging of the nose landing gear downlock microswitch raised the possibility that, despite the flickering red light on the initial approach, the nose gear might have been locked down, although the pilot had no reason to believe this in the absence of the green light. The failure of the landing gear to retract during the second go-around was caused by the failure of the hydraulic pump motor. The subsequent application of the emergency free-fall procedure was not successful in achieving lock down of the nose gear, allowing it to collapse during the final touchdown. The fact that the left main gear did not collapse until the nose gear had done so indicated that both main gears had been locked down before the final landing. It was considered probable that the rapid collapse of the nose landing gear had generated suction in the 'down' hydraulic lines, causing the left landing gear to come out of downlock. Examination of the nose gear revealed no defect, such as stiffness due to lack of lubrication, which could have accounted for the failure of this gear to lock down under free-fall operation.

At the time that the pilot was attempting to lock the landing gear down using the emergency system the weather was deteriorating, with turbulent conditions. Furthermore, there were seven persons on board the aircraft and the total weight was therefore some 300 to 400 lb below the maximum gross weight limit of 3,600 lb. In his attempts to reduce the airspeed to the required 87 kt approximately to allow the nose landing gear to free-fall against airloads, the pilot would have been aware of the

dangers of approaching the stalling speed. The weather conditions would have made accurate airspeed control a little difficult and may have led to a reluctance to reduce the airspeed into the required range. It was thus possible that the aircraft may not have flown sufficiently slowly to allow the nose gear to extend fully against the airflow. The failure to achieve downlock may also have been affected by the landing gear not having been fully retracted, as a result of the pump failure after the second go-around, at the start of the emergency free-fall attempt.