DATA SUMMARY

LOCATION

Date and time	**Thursday, 9 June 2011 at 09:40 UTC[1]**
Site	**Tenerife North Airport (GCXO), Tenerife**

AIRCRAFT

Registration	**EC-KDP**
Type and model	**PIPER PA-34-200T "Seneca II"**
Operator	**Private**

Engines

Type and model	**CONTINENTAL TSIO-360-EB1B**
Serial Number	**2**

CREW

	Examiner	Examinee
Age	**46 years old**	**43 years old**
Licence	**ATPL (A)**	**CPL (A)**
Total flight hours	**8,900 h**	**10,900 h**
Flight hours on the type	**1,140 h**	**10,080 h (ME)**

INJURIES

	Fatal	Serious	Minor/None
Crew			**2**
Passengers			
Third persons			

DAMAGE

Aircraft	**Minor**
Third parties	**N/A**

FLIGHT DATA

Operation	**General Aviation – Flight Training – Check**
Phase of flight	**Approach**

REPORT

Date of approval	**31th May 2012**

[1] All times in this report are in UTC unless otherwise specified. To obtain local time, add 1 hour to UTC.

1. FACTUAL INFORMATION

1.1. History of the flight

The aircraft was on a local check flight lasting one hour, departing from and landing at the Tenerife North Airport (GCXO). Onboard were an examinee and an examiner. While on approach and as the aircraft was being configured for landing by lowering the gear, the examiner (hereinafter the pilot in command) noticed that the green light for the left leg of the gear was off and that the red gear unsafe ("gear in transit") light remained on, while the horn continued to sound. While on the final segment of the circuit the pilot in command cycled the gear twice to no avail, and thus decided to fly low over the airport's control tower to have its staff check the condition of the gear. Tower personnel confirmed that the legs appeared to be down, but they could not confirm whether they were locked. The aircraft then proceeded to the downwind leg right of runway 30 and the pilot in command cycled the gear down and up again, once more to no avail, as a result of which he decided to lower the gear using the emergency procedure, as per the Pilot Operating Manual. This also failed to alter the condition of the indications in the cockpit, so the pilot in command decided to attempt a landing while exercising particular caution during the landing. He made contact first with the right gear and traveled some 200 m until the left wheel touched down, at which point that leg collapsed, causing the aircraft to yaw sharply to the left and depart the runway near the E3 exit taxiway (see Appendix 1), coming to a stop some 40 m away from the runway centerline at a 180º angle with respect to the initial landing direction.

Figure 1. Final position of the aircraft

Neither occupant onboard the aircraft was injured.

The aircraft suffered damage mainly to its left wing (wingtip, aileron and flap). The pitot tube was also torn off and there were dents and scratches on the underside of the fuselage and on the rear horizontal stabilator.

1.2. Personnel information

The examiner, a 46 year old Spanish national, was in the RH seat. He had valid and in force ATPL (A) and CPL (A) licenses and class 1 and 2 medical certificates, along with the following ratings: MEP (multi-engine), SEP (single-engine), ATR 42/72, IR (instrument) and

FI (flight instructor); all of them valid and in force. He had a total of 8,900 flight hours, 1,140 on the type. He also had a valid EASA flight examiner license.

The examinee, a 43 year old Venezuelan national, was in the LH seat and had a valid and in force CPL (A) license and class 1 and 2 medical certificate. He had valid MEP (multi-engine), SEP (single-engine) and IR (instrument) ratings; all of them valid and in force. He had a total of 10,900 flight hours, 10,080 of which had been on multi-engine airplanes. The purpose of the incident flight was to check his MEP and IR ratings.

1.3. Aircraft information

The aircraft, a Piper PA-34-200T "Seneca II", registration EC-KDP and S/N 34-7970149, is a low-wing twin-engine aircraft outfitted with two Continental TSIO-360-EB1B engines, two three-bladed MacCauley propellers and retractable gear.

The aircraft is based at the Tenerife airport where it is used as a school and training aircraft. It had a valid airworthiness certificate.

The aircraft had around 3,363 h and its last inspection (the 100 h/annual inspection) had been performed at the 3,337 h mark on 2 December 2010 at a maintenance center in Portugal. The aircraft's usual maintenance center is located on the island of Gran Canaria.

The aircraft was normally parked outside the hangar on the tarmac, and it did not fly many hours during the year, experiencing long periods of inactivity. The flight logs checked revealed that in 2009 the aircraft had flown 35 hours 15 minutes; in 2010, 57 hours 48 minutes, and in 2011, up to the date of the incident, 16 hours. In the previous month (May), it had flown 2 hours 25 minutes, the last flight having taken place on 18 May 2011 and lasting 30 minutes.

The gear system on this aircraft is deployed and retracted hydraulically by means of a reversible electric pump. A lever on the instrument panel is used to select the gear to the UP or DOWN position. The condition of the gear is indicated by three green lights located above the lever when the gear is down and locked, and by a red light at the top of the panel when the gear is unsafe. The electric pump is turned off when the three gear locked switches on the legs are activated.

The leg locking system consists of a tab or hook that, once the mechanical system is fully extended, lodges in a small pin that keeps the leg from retracting (see figure 3)[2].

[2] The hook is component 30 and the pin component 32.

Figure 2. General view of the aircraft

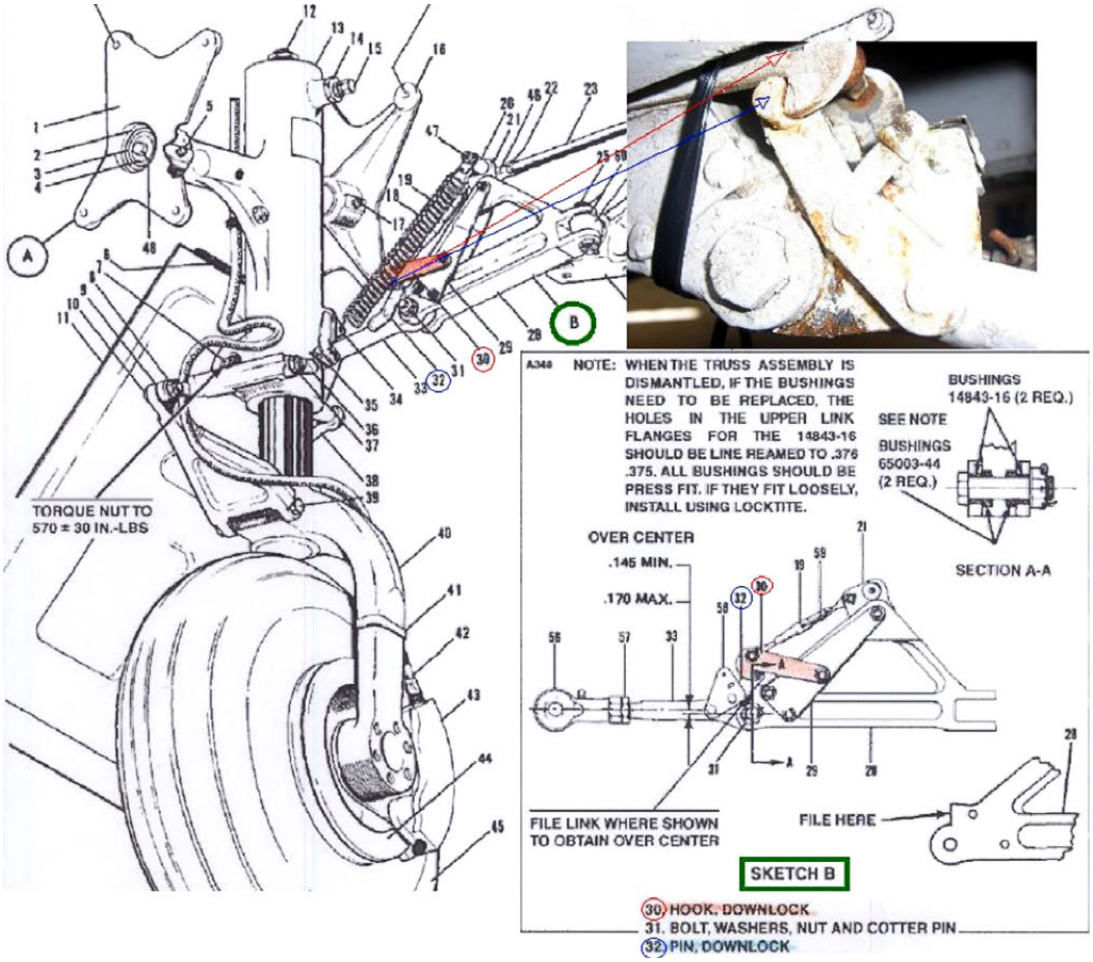


Figure 3. Structure of leg and locking mechanism

1.4. Meteorological information

At the time of the landing, there was good visibility at the airport with broken clouds at 1,800 ft. The temperature was between 16º and 17 ºC and the wind was from 330º at 15 kt.

1.5. Aerodrome information

The Tenerife North Airport is located in the north of the island, 13 km west of the city of Santa Cruz de Tenerife. It has one 3,171 m long, 45-m wide runway in a 30/12 orientation. The ARP[3] is at an elevation of 2,077 ft.

At the time of the incident work was being done on the airport apron in an area near the aircraft's usual parking stand (within some 20 m). The work consisted of breaking up the pavement and digging some two meters deep for the purpose of building a new apron and hangar (see Appendix 1 and figure 4).

Figure 4. Work near the aircraft's usual parking stand

[3] ARP: Aerodrome Reference Point.

The prevailing winds at this airport are from the north.

The conditions specific to the location of the airport resulted in a very humid and saline environment.

1.6. Inspection of the aircraft

The aircraft was initially inspected while it was being removed from the incident site. The aircraft was hoisted by the engine mounts with a crane and, while in this position, the gear was cycled by activating the master switch and returning the emergency lever to its original position. The hydraulic pump worked, causing the left gear leg to lower, though the locking hooks did not lower. There was a lack of grease and signs of corrosion were visible on the moving parts of the left gear system (some corroded areas had even been painted over). One of the mechanics helping to move the aircraft used an iron bar on the mechanism to gain leverage and managed to lower the locking tabs.

Once the aircraft was moved to the hangar and placed on jacks, a new check was made of the landing gear system. The left gear behaved in the same manner, with the gear lowering with the hydraulic pump but the leg failing to lower fully or lock. Its operation was checked by lowering the gear using the emergency system, which yielded the same results. The only way to lock the leg was by fully extending it manually, employing considerable force and using some kind of tool, such as a screwdriver, to gain leverage and force the locking tabs to lower. The pump was verified to be working correctly and the hydraulic fluid level was checked.

Unlocked left gear leg

Condition of the left gear leg locked in place with a flange

Figure 5. Condition of the locking mechanism on the left gear leg

2. ANALYSIS AND CONCLUSIONS

The aircraft was on a check flight departing from and landing at the Tenerife North Airport (GCXO). During the approach, the crew noticed by way of the lights and horns in the cockpit that the left gear was not in its proper down and locked position. The condition of the gear was verified visually with the aid of air traffic control personnel in the tower, who saw that the gear was down but could not confirm whether it was locked. After unsuccessfully cycling the gear several times, including once in emergency, the crew decided to land by touching down gently. During the landing run, the left gear collapsed as soon as it touched the ground, causing the aircraft to turn left and depart the runway, turning 180º from the original landing course.

This aircraft was not flown many hours in a year (it had flown 59 h in the year before and in 2011, up to the date of the incident, it had flown some 16 h), so the maintenance inspection conducted was the annual inspection, with the last one having been completed in December 2010.

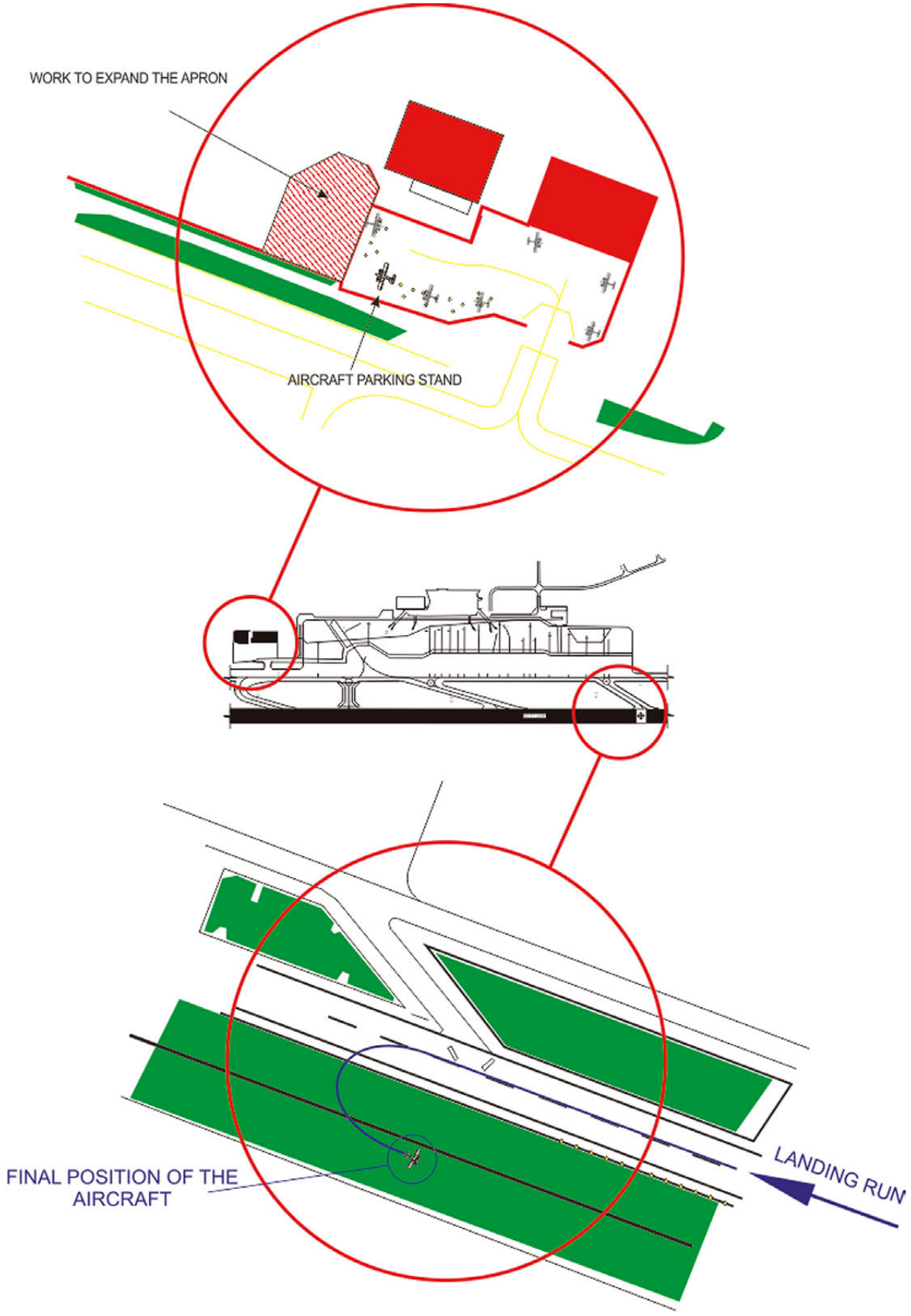
The aircraft was normally parked outdoors in the general aviation parking, very close to the area where work was being performed to expand the apron, which meant that the prevailing northerly winds typical on the island would carry dirt and dust in the direction of the parked aircraft.

During the inspection both on the runway at the incident site and subsequently in the hangar, it was noted that the hydraulic pump used to lower the gear worked properly, since all three legs deployed, though the left leg did not lock. The hydraulic fluid level was adequate and the gear unsafe warning systems in the cockpit had worked properly. The mechanism on the left gear leg was dusty and showed signs of corrosion and a lack of grease, which hampered the full extension of the gear, and thus of the locking tabs. A great deal of leverage had to be used to lock the leg in place. The fact that the aircraft's normal Maintenance Center was located on another island made the early detection and correction of the severe corrosion difficult. Moreover, some of the corroded parts had been painted over.

Based on the information available, the incident is believed to have occurred due to a restriction of the left gear deployment and locking system that kept the left leg, and thus the locking tabs, from deploying fully. The humid and saline air in the area, along with the relative inactivity of the aircraft, had resulted in water and dust accumulating in the landing gear, causing a restriction that went undetected until an attempt was made to lower the gear.

APPENDIX I

Diagram showing the landing run of the aircraf and its normal parking position on the apron


WORK TO EXPAND THE APRON
AIRCRAFT PARKING STAND
FINAL POSITION OF THE AIRCRAFT
LANDING RUN