



PAKISTAN CIVIL AVIATION AUTHORITY
(SAFETY & INVESTIGATION BOARD)



SERIOUS INCIDENT TO M/S. ASSL
PIPER SENECA – III, AIRCRAFT, REG. # AP-BCK
ON 22 MAY 2010 AT PARACHINAR AIRPORT

FINAL REPORT

SERIOUS INCIDENT TO M/S AIRCRAFT SALES & SERVICES AIRCRAFT PIPER SENECA – III, REG. NO. AP-BCK AT PARACHINAR AIRPORT ON 22 MAY 2010

SYNOPSIS: Refer Director General Civil Aviation Authority Memorandum No.HQCAA/1901/335/SIB dated 24 May 2010 (**Appendix 'A'**). On 22 May 2010, a chartered flight of Piper Seneca – III of M/s. Aircraft Sales & Services, Reg. No. AP-BCK was operating from Peshawar to Parachinar Airport. Reportedly, aircraft was carrying five passengers and one pilot. Take off from Peshawar and flight till Parachinar was uneventful. During landing at Parachinar runway, nose gear strut of aircraft broke and propellers of both engines along with the nose of the aircraft touched the runway. Aircraft came to stop at approx 2000 feet of distance from beginning of the runway after sharp 90 degree right twisting turn during which both the main landing gears collapsed / broke and aircraft rested on its belly. No fire was observed and the occupants came out unhurt.

1. FACTUAL INFORMATION

- 1.1 **History of the Flight:** Chartered Flight from Peshawar to Parachinar Airport.
- 1.2 **Injuries to Persons:** No injury to passengers was reported. However, pilot had two minor cuts on forehead and nose.
- 1.3 **Damage to Aircraft:** Aircraft sustained major structural damage including broken Nose Landing gear strut, collapsed / broken Main landing gears and badly damaged / bent Propellers which were found completely separated from the respective engines. Fuselage twisted / buckled from various positions and fire wall and cowling damaged. Detail of damages is as below:



- 1.4 **Crew Information:** Single aircrew operations.
- 1.5 Captain of aircraft had following experience
 - 1.5.1 Total experience : 2070:00 hours.
 - 1.5.2 On type experience : 40:00 hours.
 - 1.5.3 Total experience as Captain : 1750:00 Hours
 - 1.5.4 The Captain had valid medical, ATPL and rating from PCAA.

1.6 **Passenger Details:** There were total of 06 persons on board, including one aircrew.

1.7 **Airfield Information:**

1.7.1 The general area around Parachanaar is mountainous and demands VFR flying. There being no Nav aid available and progressively increasing flying intensity, it requires continuous higher level of vigilance, and adding to that the difficult terrain, it is a difficult area for Light / General Aviation Aircraft to fly in. All flights planned to Parachinar are strictly conducted in clear skies and under no weather conditions. Parachanaar runway is tricky in itself as it is built with shallow rising gradient. It gives illusion of being high, especially to pilots who are not well familiar with this area.

1.7.2 Air Traffic coordination / clearance is managed by aircrew themselves in air on frequency allotted to Pak Army.

1.7.3 While boarding aircraft from Peshawar, all passengers and their baggage is security checked by ASF. The aircrew is responsible for weighing and then loading the baggage into the aircraft. Weight of luggage is aircrew's guess as no weighing scale is used in entire process.

1.7.4 There is no proper security check arrangement for passengers and their luggage at Parachinar airport.

1.8 **Aircraft Information:**

1.8.1	Aircraft Model	: PIPER SENECA – III
1.8.2	Type of Aircraft	: PA34-220T
1.8.3	Manufacturer Serial Number	: 34-8533018
1.8.4	Date of Manufacture	: 1985
1.8.5	Aircraft Registration	: AP-BCK,
1.8.6	Aircraft Hrs	: 8831.30
1.8.7	Engine Model	: Teledyne 02 cont. LT SIO-360-KB Engines.
1.8.8	Engine # 1	SN 81136-R TSO 684.35
1.8.9	Propeller #1	SN 950242 : Part No. 3AF32C508-C, TSN 1816.55, TSO 225.30
1.8.10	Engine # 2	SN 812180-R : TSO 878.50
1.8.11	Propeller #2	SN 951389 : Part No. 3AF32C509-C, TSN 1789.35, TSO 198.10

1.9 **Aircraft and engine history:**

1.9.1 Scrutiny of the aircraft flight log book revealed no specific trend related to aircraft system performance and engine performance.

1.9.2 Scrutiny of last 06 months defects history record revealed no specific trend in Engine, Landing Gears and Flight Controls.

1.9.3 Scrutiny of the aircraft flight tech log book revealed only two defects reported after 02 April 2010, one on 24 April 2010 regarding right engine rough run for which ground run was carried out after plug cleaning, and second defect was reported on 22 May 2010 (incident day) regarding bird hit on propellers. Routine defect recording such as brakes malfunction, engine parameters adjustment, hydraulic leak, throttle adjustment, instrument defective etc were not being indicated.

1.9.4 Last major maintenance, Check-I was carried out at 8771.30 aircraft hours and last Check-II carried out at 8825.30 aircraft hours.

- 1.9.5 Last Check – I carried out on Engine # 1 Sr. No. 811363 – R on 20.04.2010 at 624.35 hrs and Check – II at 678.35 hrs on 20.05.2010.
- 1.9.6 Last Check - I carried out on Engine # 2 Sr. No. 812180 – R at 818.50 hrs on 20.04.2010 and Check – II at 872.5 hrs on 20.05.2010.
- 1.9.7 Last Check – I carried out on Propeller # 1 Sr. No. 950242 at 165.30 on 20.04.2010 and Check – II at 219.30 on 20.05.2010.
- 1.9.8 Last Check – I carried out on Propeller # 2 Sr. No. 951389 at 138.101 and Check – II at 192.10 on 20.05.2010.
- 1.9.9 On 22 May 2010, two trips to Parachinar were scheduled to fly from Peshawar to Parachinar Airport and back for passengers, however, during first take off roll bird hit was reported on right propeller and aircraft came back for inspection. Aircraft was released for flying by AME, after full powered ground run along with visual inspection, and clearance on telephone from AW Karachi.
- 1.9.10 Audio Horn warning was reported by pilot during cruise at 8500 feet at 0915 hrs during first flight from Peshawar to Parachinar which stopped after switching master avionics. However, no fault analysis and rectification to this effect was undertaken due to non duplication of the defect on way back to Peshawar.
- 1.9.11 During the second sortie, the audio horn warning was again observed during descend from 8500 feet to 6500 feet, however, as stated, all three green lights for landing gear in the cockpit indicated gears down, hence the pilot made the landing at Parachinar.
- 1.10 **Wreckage and Impact Information:** Aircraft impacted with ground at Parachinar runway at 600feet down the runway during landing, after rebound, at about 1100 feet dug marks of both Propellers were observed, nose gear strut of aircraft broke at about 1700 feet and propellers of both engines and the nose of the aircraft touched the runway again. Aircraft came to stop at approx 2000 feet of distance from beginning of the runway after sharp 90 degree right twisting turn, resulting into collapsed / breakage of both the main landing gears and hence aircraft rested on its belly as shown below:



- 1.11 **Flight Recorder / CVR:** Aircraft was not equipped with FDR / CVR.
- 1.12 **Weather Information:** Weather reported was partly cloudy; wind at Parachinar Airport was light and variable, and visibility more than 10 KM.
- 1.13 **Fire / Smoke:** Fuel / oil leakages of moderate nature were observed, however, no fire / smoke was reported.
- 1.14 **Aircraft Wreckage Analysis:** After the occurrence the survey of accident site was conducted, the important signs / marks on the runway and evidences were preserved through digital photography. Damaged aircraft and scattered parts were examined with a view to establish cause/s of accident. The wreckage detail as seen below:



2. ANALYSIS

2.1 Technical Analysis

- 2.1.1 Initial inspection and physical operation of aircraft flight control system revealed that aircraft control systems were functioning normal. However the breakage pattern of nose landing gear strut and other components required further detailed analysis for ascertaining the pre or post impact crack / brakeage or any other abnormality. The same could not be done due to non availability of damaged nose landing gear by M/s. ASSL, although the photographs of damaged components were sent to Aeronautical Research Centre (ARC), PAC, Kamra and detailed discussions was held with experts of ARC to eliminate all possibilities and any other technical probable cause of occurrence. However, further study could not be done due to non availability of damaged parts and willingness by M/s. ASSL.
- 2.1.2 The investigation of aircraft various systems, aircraft instruments, record of life components & inspections due, complete aircraft history, weight and balance validity,

C of A validity indicate that aircraft systems were serviceable; all instruments were secured and functional.

- 2.1.3 Post impact examination revealed that; there were three impacts starting from the first impact at 600 feet down the runway and after a bounce, the second impact was at 1100 feet down the runway where propeller deep dug marks were found on ground and propeller were observed to be bent. The third impact was indicated at 1700 feet where the breakage of nose landing gear strut and touching of front section belly were reported.
- 2.1.4 Aircraft impact pattern, position of scattered debris, type of parts damaged and stress / marks indicated that the aircraft had made touch down at higher than recommended speeds.



- 2.1.5 Due to non availability of required equipment, visual inspection was being carried out for nose gear steering control and travel, nose gear strut, gear forks, gear housing, torque links and attachment plates for cracks, bends or misalignment during check – II inspection.
- 2.1.6 Aircraft work sheet had blank columns and rows; serial number of the engine was not recorded. Entries in the work sheet and log book did not match.
- 2.1.7 Trim sheets for the operations conducted from Peshawar were not available.
- 2.1.8 There was no write up regarding Audio Horn warning defect observed by aircrew during previous flight and no adjustment record to this effect was found in aircraft work sheet and aircraft flight tech log book.
- 2.1.9 Aircraft was given ground run post bird hit, and verbal clearance by Airworthiness North through SMS on cell phone without ascertaining the condition of the aircraft was issued.
- 2.1.10 M/s. ASSL could not ensure availability of damaged parts for structural analysis to eliminate all probable causes.
- 2.1.11 **Conclusion** Material failure analysis of Landing Gears was arranged at Aeronautical Research Centre (ARC), PAC Kamra to look into the possibility of failure of gear (s). The exact cause of breakage of Nose Landing Gear struts could not be ascertained due to its non availability for material analysis, and hence detailed stress pattern could not be concluded.

2.2 Operational Analysis

- 2.2.1 It is generally believed by all pilots, that Seneca III aircraft is one of the most difficult aircraft to fly. The main reasons are its lesser clearance of prop from ground, relatively sluggish controls at lower speeds and unusually low flare height.
- 2.2.2 Incident pilot, a newly inducted pilot in ASSL was given Seneca III training at Karachi and was type rated from CAA on his ATPL License. Later, he was based at Peshawar for operating Parachinaar flights.
- 2.2.3 Parachanaar airport being one of the difficult airports of Pakistan, some especial training flights (under supervision) are done before one is cleared to fly as Pilot in Command. Incident pilot took more than usual time to get trained for landing in Parachanaar. Normally, 15:00 flying hours are considered sufficient, but in this case 29:20 hours were flown before he was cleared for Parachanaar operations.
- 2.2.4 Available video and pictures obtained from Parachinar along with aircrew examinations were analysed. Following is revealed:
- (a) While landing at Parachinar, aircraft made a touch down at 600 ft (as stated). Exact approach path, and speeds at touch down could not be determined.
 - (b) Nose wheel touched ground almost simultaneously and nose vibration were experienced by pilot (as stated). NLG receives first damage to its strut.
 - (c) Brakes were applied at 1100 ft down the runway; tyre marks of both main wheels of the aircraft were visible on runway.
 - (d) Aircraft nose wheel, tyre mark of nose wheel start at 1200 ft which continue for just about 50 ft, main gear tyre marks also continue. NLG strut is assumed to be broken. As stated, pilot applies full back pressure (to hold the nose of aircraft up in the air) to avoid propeller hitting ground.
 - (e) At 1250 ft from runway beginning, nose wheel tyre marks disappear. Both main wheel tyre marks continue, both propellers hit the ground first time (2 – 4 marks of each propeller). NLG not supporting aircraft anymore.
 - (f) At 1300 ft, aircraft jumps ahead by 8 – 10' longitudinally (most probably as a result of propellers touching the runway surface), lands on main wheel, main gear tyre marks continue. No tyre marks of nose wheel.
 - (g) All this while (as stated) pilot keeps controls column full back, there are no tyre marks of nose wheel, no marks of propellers hitting ground. Aircraft travelling on main wheels and marks are visible. At 1500 feet of distance pilot cuts off throttles, as stated.
 - (h) At 1600 ft nose gear "strut" (the remaining one with the aircraft) hits runway and collapses. Both propellers touch ground leaving cut marks on both sides on the runway and aircraft continues to skid forward. Engine oil starts leaking / dripping on the runway.
 - (i) At 2000 ft down the runway, aircraft sharply turns 90° to right. During this turn both main gears collapse to the right, aircraft stops on runway and rests on its belly. Both propellers get separated from engines mounts indicating running engines.

3. CONCLUSION

3.1.1 Higher than normal speed during approach and touch down resulted in shallow approach angle. Inadequate landing practice on airfield like Parachinar allowed aircraft to contact with runway on all three wheels, breaking NLG strut and thus touching both propellers and subsequent damage to aircraft beyond repair. NLG breakage is also analysed to be because of hard landing coupled with previous stresses of similar type of landings.

3.2 Observations

- 3.2.1 Initial and important details of incident could not be ascertained due to lack of information and there being no proper communication links to Parachinar.
- 3.2.2 Training file for incident pilot and a few others were observed to be sketchy, with no / incorrect dates on them.
- 3.2.3 Operation Manual does not include complete list of responsible office bearers working in ASSL. Also, disparity observed between areas of responsibilities mentioned in Operations Manuals for Dir Ops, Ops Manager, Dir Engg, Chief Pilot etc and actually being practiced and exercised.
- 3.2.4 DMD and DFO have been observed not assigned with responsibilities commensurate their appointment. Chief Pilot not responsible for aircrew training.
- 3.2.5 Wreckage of aircraft was handed over to insurer without the clearance of Investigation Incharge.
- 3.2.6 Damaged aircraft kept lying close to edge of the runway, posing safety hazard. Later, aircraft was burnt at the site. Operator did not display responsible attitude towards clearing the wreckage.
- 3.2.7 Due to non availability of passengers and any other witness, airport staff / management at incident location, considerable difficulties were faced to identify the exact cause of incident landing.

3.3 Findings

- 3.3.1 Aircraft was found airworthy for the flight.
- 3.3.2 Weather conditions were no factor to the incident.
- 3.3.3 Aircrew had adequate experience and had received training for Parachinar Operation, however, he was observed to be slow learner.
- 3.3.4 On incident day, aircrew had already done one sector to Parachinar, and had received false audio warning for unsafe gears during descend but he did not make write up on Tech Log.
- 3.3.5 During incidental flight, aircrew stated that he had once again received audio warning for unsafe gears during descent.
- 3.3.6 Exact speed and rate of descent of aircraft during approach and touch down could not be ascertained.
- 3.3.7 After observing nose vibrations, aircrew held nose up for as far as, he could.
- 3.3.8 Most probable reason for nose wheel vibrations is analysed to be result of three pointer touch down where nose gear strut broke on its first contact with runway.
- 3.3.9 As the Seneca aircraft has lesser propeller clearance from the runway, there is a probability of touching both propellers during hard / three points touch down.
- 3.3.10 At this stage, it is concluded that aircraft was high on approach, had higher speeds and shallow attitude on touchdown.

- 3.3.11 Due to broken nose leg strut, both propellers touched the runway and force the aircraft spun / twist right (due to rotation effect of propellers).
- 3.3.12 Due to sharp turn right at moderate speed, both main gears collapsed.
- 3.3.13 Since aircraft stopped at 2000 feet, indicates being higher on speed at touchdown.

3.4 Cause of Occurrence

- 3.4.1 Most probably cause of the serious incident is improper landing techniques and less than desired Supervision of Company on Parachinar Operation.
- 3.4.2 Less than required safety oversight is observed to be contributing factor for Peshawar - Parachinar Operations.

3.5 Investigation Support by the Operator

- 3.5.1 There was required cooperation, however, inadequate support was extended by the Operator.

4. SAFETY RECOMMENDATIONS

- 4.1 Aircrew training system and its monitoring at ASSL be greatly ensured.
- 4.2 Adequate Safety Oversight for such Operations be also ensured by CAA by presence.
- 4.3 Management of ASSL to ensure stricter compliance to the Operations Manual with regard to responsibilities of nominated posts and its execution accordingly.
- 4.4 While investigation remains in progress, the damaged aircraft should not be handed over to insurance companies without the clearance of SIB.
- 4.5 The damaged aircraft must be preserved / guarded by concerned CAA Authorities / Operator till it is released by Investigation Team / SIB.
- 4.6 Verbal clearance by Airworthiness Inspectors be minimized.
- 4.7 CAA Regulators to evaluate adequacy of resources and infrastructure (implementation of SMS) of the Operator at the location before such approvals.
- 4.8 With regard to the provision of adequate safety oversight by CAA, the contents of SIB letter No. HQCAA/1901/335/SIB dated 27 May 2010 be ensured.