



AIRCRAFT ACCIDENT INVESTIGATION REPORT



**RUNWAY EXCURSION ACCIDENT
FOKKER-27 REG # AP-AUR AT CHITRAL ON 16 JUNE, 2004
PAKISTAN INTERNATIONAL AIRLINE**

*Safety & Investigation Board
Headquarters Civil Aviation Authority*

**ACCIDENT TO M/S PIAC F-27 REG # AP-AUR AT CHITRAL
AIRPORT ON 16 JUNE 2004**

Authority: Director General Civil Aviation Authority
Memorandum No.HQCAA/1901/292/SIB
dated 16 June 2004 (Appendix 'A').

Synopsis PK-660, a Fokker (F-27) took off from Peshawar at 0303 UTC on a schedule flight to Chitral with 51 souls on board including a crew of four. The flight was uneventful till its final approach at Chitral. The aircraft approached with 26.5° flaps instead of 40° at speeds in excess of 150 kts instead of 100 kts for the given weight of the aircraft. Resultantly, the aircraft touched down about 1000 feet down on a 5800 feet long runway at 140 kts i.e. about 50 kts higher touch down speeds. The aircraft could not be stopped on the runway and entered the unpaved overrun. The aircraft undercarriages broke and it skidded on its fuselage before coming to a stop 500 feet beyond runway end. The aircraft and the left engine sustained major damage. There was, however, no fire, no collateral damages and no injuries to persons on board. The PIC was found under the influence of marijuana in post accident pathological tests.

1. FACTUAL INFORMATION

1.1 History of the Flight

1.1.1 Flight PK-660 was a scheduled regular public transport operation. The designated route for this flight was Islamabad – Peshawar – Chitral. The return journey was to be via the same route to Islamabad.

1.1.2 Its take off from Islamabad and landing at Peshawar (on the first sector) was uneventful. The aircraft was found serviceable and no snags were reported at the culmination of

this sector. After a brief stop-over at Peshawar the flight departed for Chitral at 0803 hrs PST.

1.1.3 The aircraft took off from Peshawar for Chitral with 51 souls on board including a crew of four. It left Peshawar with 18106 kgs gross weight and landed at Chitral with 17531 Kgs. The reported landing time was 0841 hrs PST. Enroute the pilot flying was the PIC, who had flown this sector for many years. The aircraft landed at exceptionally high speeds and therefore could not be stopped on the paved runway surface and entered the kutchra area beyond the end of the runway. The area beyond the paved runway was infested with drains varying in width from 2 feet to 9 feet and a depth of 6 inches to 18 inches. The aircraft sustained major structural damages and was beyond economical repairs.

1.1.4 The PIC is an experienced pilot with over 3000 hrs in command on Fokkers and over 5900 hrs of total flying experience.

1.1.5 After crossing Lowari pass the rate of descent of the aircraft was higher than normal. As against a normal rate of descend of 800 feet per minute, AP-AUR was seen descending at over 1000 feet per minutes wherever a descent was undertaken (FDR).

1.1.6 Songs were being played in the cockpit at a very high pitch throughout the recordings available on the CVR. The volume of songs was reduced (but not switched off) only about 2 minutes before touch down.

1.1.7 According to the statement / Question – Answer of PIC (App "B") he lowered the flaps to 26° and then to 40° but the flaps indication remained at 26°. The co-pilot stated that the PIC, who was also the pilot flying, lowered the gears and the

flaps himself. CVR negates both these statements. The gear and flaps were both lowered by the co-pilot on the instructions of the PIC about one minute before landing.

1.1.8 The explanation for the very high approach speed given by the PIC was that since flaps did not lower below 26° (to 40°) and he was high, he lowered the aircraft nose to lose height. This caused the aircraft speed to increase. FDR revealed no such nose dive attitude.

1.1.9 No gears or flaps were lowered when it should have been done before reaching the designated point preparatory to landing.

1.1.10 As the PIC was under the influence of drugs (Marijuana), it is inferred that he forgot to perform the checks at their appropriate time.

1.1.11 The aircraft speed did not dissipate because neither landing gears nor flaps were lowered till the aircraft was about 500 feet AGL and less than one minute short of touch down.

1.1.12 When gears and flaps were lowered the speed was in excess of 160 kts.

1.1.13 Since the aircraft speed was high, it floated for a longer time and touched down at 140 kts almost 1000 feet down runway, which is 5800 feet long.

1.1.14 The reason cited for the overrun i.e flaps not lowering beyond 26.5° is not substantiated.

1.1.15 Emergency brakes, ground fine and engine switch off technique to stop the aircraft in the minimum distance were not resorted to as described in FCOM.

1.1 **Injuries to Persons:** Nil.

1.2 **Damage to Aircraft**

1.2.1 Post accident inspection of the aircraft showed that the aircraft had sustained extensive damage, including major damage to the aircraft air frame structure. The aircraft was beyond economical repairs and constituted a hull loss. A number of damages were discovered on detailed inspection by the technical member, which is at (Appendix "D"). Salient damages were:

- a. Major structural damage.
- b. Left propeller and internal engine damage.
- c. All under carriages broken.



LANDING GEARS BROKEN & ENGINE PROPELLER DAMAGE



HULL FRACTURES ON FLOOR



1.4 **Other Damages:** No collateral damage.

1.5 **Aircrew Information**

1.5.1 **Pilot-in-Command**

- a. Name: Irfan Mahmood Faiz
- b. Position in the Cockpit: Captain
- c. Date of Birth: 11 October 1958
- d. Type of License held and #: ATPL # 1008
- e. Validity of License: November 2004
- f. Medical date with status: 20-04-2004, Class-I

1.5.2 **Rating:**

- a. Type(s) held: C-150/152/172, DHC6, B-737, A-310.
- b. Type Current: F-27
- c. Assist/Flight Instructor Rating: Nil
- d. Check Rating: Route Check

1.5.3 **Flying Experience:**

- a. Grand Total: 5950:00 hrs Approx
- b. Total In Command: 3656:00 Approx
- c. Total In Command on the type accident occurred:
3144:00 hrs Approx

1.5.4 **Date of Joining PIAC:** 26 December 1988

1.5.5 **Personal Schedule of Past 72 Hrs:** There was no abnormality found in the pilots' activities during the last 72 hrs prior to the mishap landing.

1.5.6 **PIC's Previous Flying Record:** It was discovered during the course of the investigation that Captain Faiz had, on a previous occasion, rejected a take off at Multan after crossing VR speed (the aircraft was airborne), which was in

gross violation of the procedure and practices the world over. Whether this was lack of knowledge, casual attitude or complacency, cannot be ascertained as no investigative record on that occurrence was available. It is, however, recorded in the Captain's personal file, that he should use the privilege of his discretion judiciously (attached Appendix 'N'). This admonishment was rather mild for the offence committed by the pilot, who jeopardised the safety of the passengers, crew and the aircraft.

1.5.7 First Officer

- a. Name: First Officer Faisal Waheed
- b. Position in the Cockpit: Right Seat
- c. Date of Birth: 15 September 1973
- d. Type of License held and #: CPL / IR 1879
- e. Validity of License: May 2005
- f. Medical date with status: Class-I

1.5.8 Rating:

- a. Type(s) held: F-27
- b. Type Current: F-27
- c. Assist/Flight Instructor Rating: Nil
- d. Check Rating: Nil

1.5.9 Flying Experience: Cessna-150/152/172, F-27

- a. Grand Total: 3100 hrs
- b. Total In Command: Nil
- c. Total In Command on the type accident occurred: Nil

1.5.10 Where trained: USA / TEXAS

1.5.11 Date of Joining PIAC: 03 March 1996

1.6 Medical & Pathological Information Blood and Urine report of the Cockpit Crew are placed in the Appendix 'K'. The Urine sample of the Captain tested positive for Marijuana. Blood reports were normal.

1.7 Meteorological Information

Weather at Chitral was clear. Wind was calm and the temperature was 26°C. Light condition was good. There was no haze. The reported visibility at Chitral was 10 KM (App 'C').

1.7 Aids to Navigation

1.7.1 Chitral has no Radio Navigation facilities like VOR, NDB or ILS etc. It caters for a visual approach / landing and has an air traffic controller placed at the ATC tower. Weather, both prevailing and forecast, is available. ATC tower radio was serviceable for this flight.

1.8 Communication

1.8.1 Standard VHF communication between ATC and aircraft is available and was serviceable at the time of the accident. No ATC/ aircraft communication recording facility is available at Chitral. ATC conversation is, however, available on the CVR.

1.9 Aerodrome Information (App'G')

1.9.1.1 As per Aeronautical Information Publication of Pakistan (AIP), the salient features of Chitral runway are:

1.9.1.1.1 It is situated at 35° 53' 10.29" N (Latitude) 71° 47' 59.70" E (Longitude).

1.9.1.2 Runway layout is 02 and 20 (Single runway).

Landing can only be performed on runway 02.

Take off can only be accomplished in 20 direction.

1.9.1.3 The runway elevation is 4900 feet AMSL and the reference temperature is 34°C.

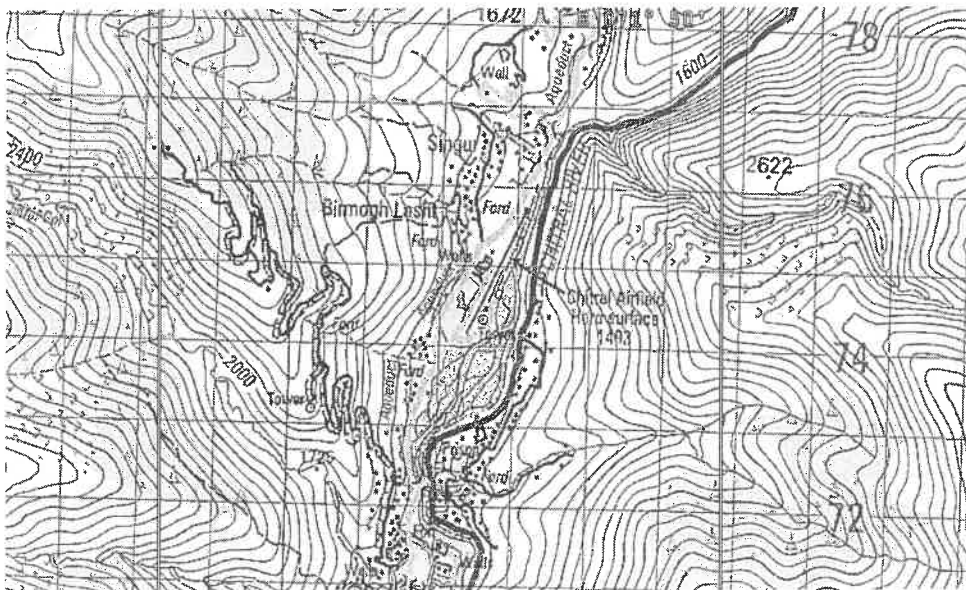
1.9.1.4 Runway dimensions are 1768 x 30 meters (Length 5800 feet, width 100 feet).

1.9.1.5 The declared distances for runway 02 and 20 are:

- * TORA: 1768 meters (5800 feet)
- * ASDA: 1768 meters (5800 feet)
- * TODA: 1768 meters (5800 feet)
- * LDA : 1768 meters (5800 feet)

Landing Profile at Chitral

1.10.2 **General Description** Chitral runway is located in a narrow valley, surrounded by mountains. on all sides. The estimated heights of the mountains around the runway vary from 500 feet to about 1500 feet AGL as viewed from the runway surface. The established landing pattern is a straight-in approach for runway 02. Take off can only be accomplished in direction 20. The area along the edges of the runway is not levelled throughout the length of the runway from the threshold to the end.



1.10.3 Normal Landing Performance F-27 normal procedures for approach and landing technique are enumerated below:

1.10.3.1 A normal descend is carried out at a speed of 180 kts and 100 psi torque, which results in an average rate of descent of 800 feet / min as per the Flight Crew Operating Manual.

1.10.3.2 The final approach speed depends on the flap settings and the aircraft landing weight.

1.10.3.3 With 26° flaps and a landing weight of 17531kgs, as was the case of the mishap aircraft, the recommended final approach speed is 105 kts.

1.10.3.4 The recommended threshold speed for landing at Chitral was 100 kts with the given landing weight.

1.10.3.5 Touch down should be made with no pressure on the brakes to allow for wheel spin-up so that the maxaret unit (antiskid) becomes effective during the subsequent braking action.

1.10.3.6 Ground fine is to be selected immediately after the aircraft nose wheel is on ground

1.11 Aircraft Information

1.11.1 The aircraft was serviceable and there were no reported snags at the culmination of its first sector from Islamabad to Peshawar. The Maximum Take-off Gross Weight (MTOGW) of AP-AUR is 19732 kgs. It took off from Peshawar with 18106 kgs.

1.11.2 Maxaret Unit

1.11.2.1 For each brake a Maxaret 'anti-skid' unit is incorporated in the brakes system. It permits maximum braking without skidding of the main wheel.

1.11.2.2 The valve and control assembly of the Maxaret 'anti-skid' unit releases the brakes on a rapidly decelerating main wheel (caused by skidding tyres) to prevent tyre bursts.

1.11.3 Aircraft Braking Options

1.11.3.1 To stop the aircraft (F-27) after landing the following options, singly or collectively, may be exercised:

1.11.3.1.1 Use of normal pneumatic brakes with/without Antiskid system.

1.11.3.1.2 Selection of ground fine.

1.11.3.1.3 Use of emergency brakes.

1.11.3.1.4 Cutting both engines after selection of ground fine.

1.11.3.2 With an average technical knowledge of the aircraft, which each pilot is expected to have, this aircraft is capable of stopping within a distance of 2000 feet. During the use of emergency brakes, however, the Maxaret 'anti-skid' unit is not available to prevent tyre burst. In the mishap landing, however, only normal braking was relied upon.

1.11.4 The PIC did not use the emergency brakes, which were found wire locked on inspection after the accident.

1.11.5 Weight and Balance

1.11.5.1 The maximum allowed take off gross weight for AP-AUR was 19,732 kgs.

1.11.5.2 Maximum allowed landing gross weight 18144 kgs.

1.11.5.3 The take off weight from Peshawar was 18106 kgs.

1.11.5.4 The landing weight at Chitral was 17531 kgs.

1.11.5.5 It is, therefore, inferred that weight and balance of AP-AUR was not in question at the time of the mishap landing.

1.11.5.6 Landing distance required by F-27 at given weight, Altitude & temperature was 3400 feet under normal circumstances and ground roll of about 2100 feet.

1.11.6 The fuel used was Jet A-4. Laboratory reports of Fuel and Oil indicated no abnormality.

1.12 Flight Recorders

1.12.1 The aircraft was equipped with CVR and FDR. Both were removed for extract readouts. FDR was downloaded at the PIA facility in Karachi, while CVR was downloaded at AAIB, UK.

1.12.2 CVR Results

1.12.2.1 **General** The CVR recording was of a very poor quality. All four tracks were, however, downloaded at the AAIB, UK. The recording showed that songs were being played in the cockpit at a very high pitch throughout the duration of the recording. The sounds of loud songs in the cockpit have marred the sounds/conversations in the cockpit, which may have been otherwise picked up by the area microphone. Substantial meaningful information was, however, gathered from the CVR.

1.12.3 Facts from CVR

1.12.3.1.1 The Pilot Flying (PF) asked for flaps 15° just a little over one minute before touch down.

1.12.3.1.2 First officer lowered Landing Gears on his own initiative

1.12.3.1.3 PIC immediately asked for 40° flaps.

1.12.3.1.4 Almost in the same breath PF changed his mind and said 'flaps 26 would do' (in Urdu), or words to that effect.

1.12.3.1.5 The PIC/PF knew he had messed up as is evident in his utterance of the words in Urdu 'rapra-ho-giya' (mess up has occurred) or words to that effect.

1.12.3.1.6 In terms of time all the events described above took place between 20 to 58 seconds before touch down.

1.12.3.1.7 The time taken by the aircraft to reach the runway end after touch down was 21 seconds. Wheel-braking sound is audible 10 seconds after touch down until aircraft entered unpaved surface.

1.12.3.1.8 Total time taken from touch down to the final stop was 26 seconds and last five seconds aircraft breaking sounds.

1.12.3.1.9 After 13 seconds of aircraft coming to a stop evacuation call is given.

1.12.3.1.10 Recording does not play back any sound akin to the deployment of the propellers in ground fine.

1.12.4 FLIGHT DATA RECORDER (FDR)

1.12.4.1 The mishap aircraft was equipped with an FDR, which was retrieved from the aircraft after the crash. FDR readings were downloaded at the PIA Engineering facility in the presence of the investigating team. To check the serviceability of the FDR, landing and take-off data for Peshawar and Islamabad, were also seen. No noticeable errors were found in the recorded parameters. The recording was neither erratic nor was it erroneous for any phase of flight i.e. take off, climb, cruise, descend and landing. FDR installed in Fokker records altitude, air speed, heading and vertical acceleration. The FDR revealed

that the rate of descend maintained by AP-AUR from 7800 feet to 6341 feet was in excess of 1500 feet per minute and from there upto 5339 feet the rate of descend was in excess of 950 feet per minute. The rate of descend two minutes before touch down to one minute before touch down was 1365 feet per minute. The rate of descend one minute before touch down and upto the touch down was 1077 feet per min. The normal recommended rate of descend is 800 feet per minute in normal descent and 300 feet / min on finals.

1.12.4.2A recommended visual approach for landing an F-27 requires glide slope to be between 2.5 to 3 degrees. The calculated glide slope maintained for the approach on the mishap landing was 5 degrees.

1.12.5 FDR calculations show that the aircraft made its first contact with the runway surface at 1000 feet from the runway beginning (RW 02 in use). The total length of the runway at Chitral is 5800 feet. The pilot, therefore, was left with 4800 feet of the prepared surface to stop the aircraft before going on the unprepared surface. The threshold speed for a Fokker with less than 18,000 Kg / 40,000 lbs weight (17,561 kgs in this case), when landing with 26° Flaps is 95 kts and approach speeds 105 kts. For same weight the threshold speed with 40° Flaps is 90 kts and approach speed 100 kts. This aircraft touch down speed was 140.5 kts. It can be inferred from this that neither the ground fine nor would the brakes be able to stop the aircraft in 4800 feet of paved surface available to the pilot after touch down. The total ground roll is 5300 feet. Salient features from FDR are enumerated below:

1.12.5.1 The aircraft approach speed was 163 kts at 500 AGL about one minute before touch down to 140 kts at touch down.

1.12.5.2 Two minutes before touch down the aircraft speed was 202.4 kts and the aircraft was on a heading of 358, at circuit altitude / final approach.

1.12.5.3 The aircraft started turning for alignment with the runway heading 42 seconds before touch down and its height was 1200 feet AGL, the speed was 171.3 kts and the rate of descend was in excess of 900 feet per minute.

1.12.5.4 The aircraft was aligned with the runway heading only 10 seconds before touch down when the height of the aircraft was 170 feet AGL, the speed was 156 kts and the rate of descent was 950 feet per minute.

1.12.5.5 The aircraft touched down at 140.5 kts, still maintaining a rate of descend of 1207 feet per minute.

1.12.5.6 No exceptional sharp speed depletion immediately after touch down indicating that Emergency Brakes were not used.

1.12.5.7 Rapid speed dissipation between frame 95689 and frame 95690 seems to be the point where the undercarriage broke.

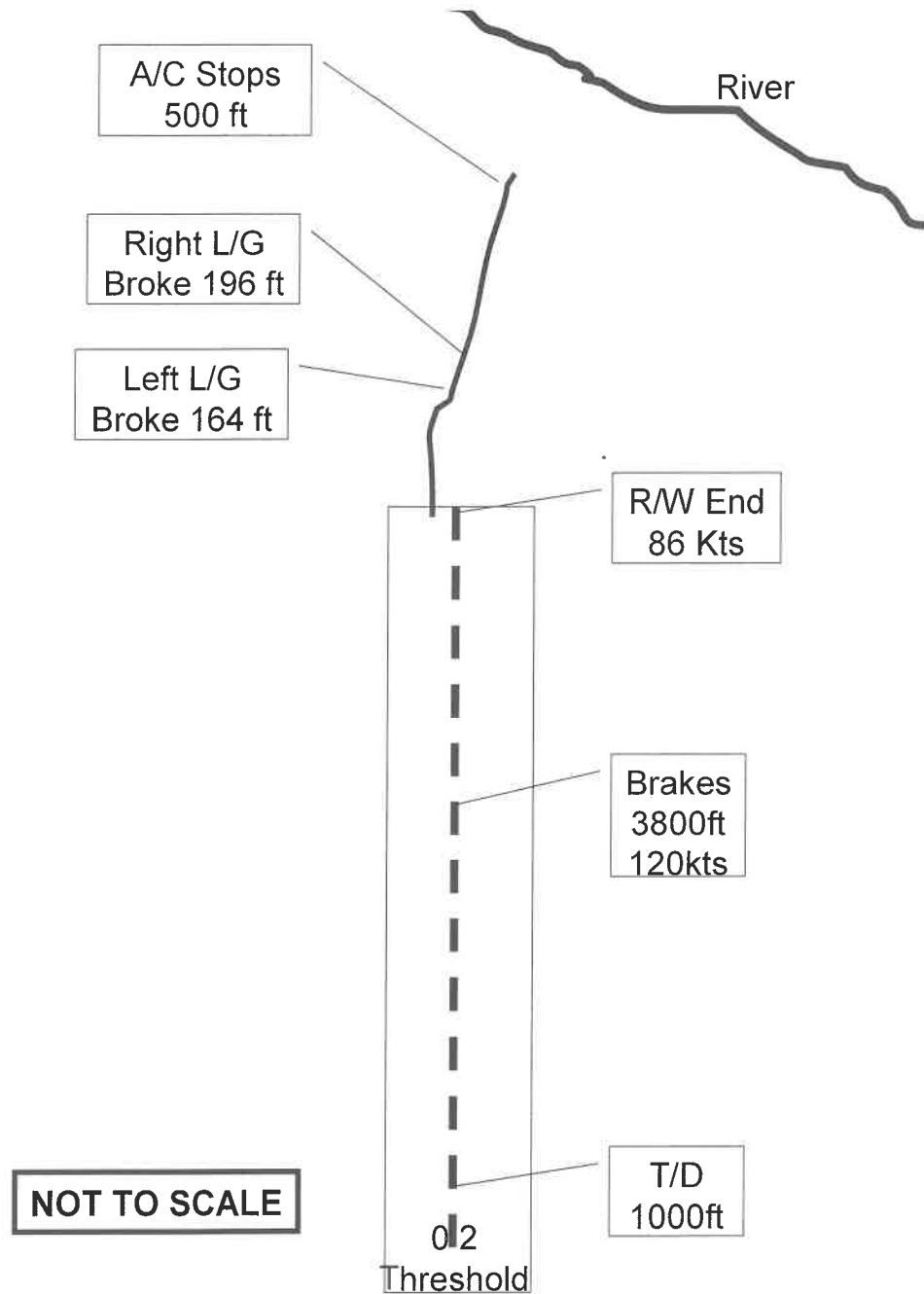
1.13 CVR & DFDR SYNCHRONIZATION

1.13.1 The DFDR and CVR were synchronized from touch down reference altitude on FDR and touch down sound on CVR. The evacuation call on CVR and VHF Key on FDR further confirmed the reference samples on FDR. Therefore, it set the datum for following flaps and landing gears extensions and respective flight parameters on FDR. The details are at Appendix 'E'

1.14 Impact Information

1.14.1 After landing the aircraft entered the unpaved surface beyond LDA. Since that area was not level, both the main

landing gears broke and were found 164 and 198 feet (left & right respectively) behind the point where the aircraft finally stopped. The left propeller touched the ground and was damaged. Other damages on the aircraft are listed under aircraft damages. Tyre- marks and other relevant impact / wreckage informations are given in the sketches Appendix 'H'.



1.15 **Fire** There was no fire on the aircraft nor was any fire caused as a result of the accident.

1.16 **Survival Aspects** Non factor.

1.17 **Organizational and Management Information**

1.17.1 PIA has been operating F-27 flights to Chitral since their arrival in the sixties. The written procedure given out to Northern Area pilots was, however, devoid of any height, speed or flaps configuration at various points on ground. While prominent land marks on ground were given as check points, every individual instructor passed on his experience of what height or speed may be maintained at the check points to make a safe landing at Chitral possible. With experience, each pilot adopted a configuration of height, speed and flaps etc over points on ground that he felt was appropriate for a safe landing. The pilots called this system 'Ceena Gazette', a vernacular jargon, meaning that the procedure was passed on from individual to individual with nothing in writing to refer to. The previous write up on Chitral was supplemented quickly by the PIA following this accident and a few details pertaining to height and speed have been mentioned for the designated check points en-route to Chitral. It was also determined that no procedure specially designed for operations at Chitral was made to cater for eventualities that may occur. A paper on Chitral Operations is available to the pilots. However, the write up is void of spelling out a procedure for landing at Chitral. It also does not say what actions may be taken in case the flaps fail to deploy beyond 26.5°. For mountainous terrain, special procedures have to be evolved as per the Flight Training Manual of Fokker F-27, page 73 (Extract in the Appendices). Although the Manual speaks of special procedure for engine failure on take off, operators must cater for any other short falls or difficulties that

might be encountered. Although the available write up mentions, 'crew can reduce the risk with planning and vigilance', it does not specify any explicit area where or how a pilot may apply this wisdom. There are no procedures available which dictate abandoning the approach if company standards for a stabilized approach are not met. In the procedure for Chitral landing, effective on the day of the accident, (attached Appendices) the general instructions specify in a Note "NO OVER SHOOT SHALL BE ATTEMPTED BELOW 500 FEET AGL EVEN WITH BOTH ENGINES". An important inference from this note should have been drawn to make operations safer. It would have been appropriate to conclude from this note that landing configuration should be completed and the aircraft should be stabilised before reaching 500 feet AGL. ***Only if configuration of the aircraft for landing is completed before reaching 500 feet AGL, would a pilot know whether all aircraft systems in support of such a landing are fully serviceable.*** If any malfunction becomes evident, pilots would still have time to make decision to go-around before reaching the critical height of 500 feet AGL, below, which they cannot plan any over shoot. This anomaly should have been addressed so that there was no ambiguity in the pilot's mind as to his decision of planning an over shoot / go-around before it is too late to take such a critical decision in mountainous terrain. Flaps' not lowering beyond 26.5° is one example of such an eventuality, which is not an emergency in ordinary circumstances; this caused an aircraft to crash in Chitral. None of the pilots interviewed, including the Chief Pilot Fokker, could give a plausible reason as to why a go-around procedure was not developed for Chitral during all these years (over 40 years).

1.17.2 Organisational Delays in Cockpit Voice Recorder (CVR) Download

117.2.1 The CVR installed on AP-AUR at the time of accident was Part # 980-6991-010, Serial # 2623. It was known on 22 Jun 2004 that the contents of the cockpit voice recorder could not be down loaded in Pakistan and would require sending it abroad. PIA Engineering kept the recorder for about four months without taking any action. On queries by the SIB, it transpired that the recorder was lying in the shop. Sometime in October/November 2004, the CVR was shifted to the Planning and Projects (P&P) Department of the PIA Engineering. From October 2004 to April 2005, P&P tried to get the CVR down loaded from various vendors. It was only through SIB's effort that AAIB UK assisted in doing the needful. A lot of time was thus lost in getting the down load, which could have been avoided.

OBSERVATIONS

1.17.3 Role of the First Officer. The role of the first officer during the entire episode was that of a 'quiet observer'. He should have been calling out the heights and speeds periodically to the Captain, who was the pilot flying. He could have reminded the Captain that they were landing without lowering the gears etc. CRM training is meant to address this issue. However, loud music played in the cockpit might have been an indication of "shut-up call" for the First Officer. A possibility substantiated in the interview with cockpit crew where PIC showed / presented himself as a bully / arrogant person.

1.17.4 Role of the Regulatory Body. PIA has been operating Chitral sector for over four decades, however, the CAA did not notice the serious flaws in the landing procedure at Chitral. Consideration for various contingencies should have been discussed and solutions formulated for possible failures before

granting the approval for the procedure. Since no such recorded exercise was carried out, the approval of the procedure becomes questionable.

1.17.5 Organization of North Office PIAC The organization of the North Office Operations, is different from Head Office organisations. The Chief Pilot North is not responsible for F-27 operations. The Deputy Chief Pilot is a Fokker Captain and he is responsible for 'scheduling' the Fokker Pilots. He is not involved with developing any policies or procedures for the area where he is actually involved with the operations himself. He follows the procedures formulated by PIA and has no say in the formulation of the procedures for F-27s flying in the Northern Area, as it seems. The entire responsibility of formulating the procedures for Chitral is vested in the Chief Pilot Training in consultation with the Chief Pilot Fokker, who is himself not current/cleared for Northern Area Operations. The system's inadequacy is, therefore, quite evident.

1.17.6 Study by Flight Safety Foundation (FSF). In one of their studies published in the Flight Safety Digest Volume 17 (Nov-Dec 98) and volume 18 (Jan-Feb 99) some very useful factors about risk reduction during approach and landing phase have been summarised in the form of a short check list. The study lists down the occasions when a go-around or a missed approach should be under taken:

1.17.6.1 After commencement of the approach, a go around or a missed approach should be conducted when:

1.17.6.1.1 Confusion exists or crew coordination breaks down.

1.17.6.1.2 There is uncertainty about situational awareness.

1.17.6.1.3 Checklists are being conducted late or the crew is task overloaded.

1.17.6.1.4 Any malfunction threatens the successful completion of the approach.

1.17.6.1.5 The approach becomes unstabilised (destabilised) in altitude, airspeed, glide path, course or configuration,

1.17.6.1.6 Unexpected wind sheer is encountered-proceed per company SOP;

1.17.6.1.7 GPWS/EGPWS/GCAS/TAWS alert proceed as per company SOP,

1.17.6.1.8 ATC changes will result in an unstable approach,

1.17.6.1.9 Adequate visual references are absent at DH or MDA.

1.17.6.2 Both the Captain and the first officer of the mishap flight in Chitral were not aware of these factors. Had they been alerted by such tips through the system management, they may have questioned the procedures laid out for Chitral, which does not specify that landing configuration must be completed before the aircraft reaches 500 feet AGL (Decision Height).

1.17.7 Elements of a Stabilised Approach

1.17.7.1 Generally it is known that all flights must be stabilized by 1000 feet AGL in IMC and by 500 feet AGL in VMC for the runway elevation in use. An approach is stabilized when all of the following criteria are met:

1.17.7.1.1 The aircraft is on the correct flight path.

1.17.7.1.2 Only small changes in heading and pitch are required to maintain the correct flight path.

1.17.7.1.3 *The aircraft speed is not more than $V_{REF} + 10$ knots indicated airspeed and not less than V_{REF}*

1.17.7.1.4 *The aircraft is in the correct landing configuration.*

1.17.7.1.5 *Sink rate is no greater than 1000 feet per minute, if an approach requires a sink rate greater than 1,000 feet per minute; a special briefing should be conducted.*

1.17.7.1.6 Power setting is appropriate for the aircraft configuration and is not below the minimum power for approach as defined by the aircraft operating manual.

1.17.7.1.7 All briefings and Checklists have been conducted.

1.17.7.1.8 Specific types of approaches are stabilized if they also fulfil the following: ILS approaches must be flown within one dot of the glide slope and localizer; a Cat II or III ILS approach must be flown within the expanded localizer band, during a circling approach, wings should be level on finals when the aircraft reaches 300 feet above airport elevation; and

1.17.7.1.9 Unique approach procedures or abnormal conditions requiring a deviation from the above elements of a stabilized approach require a special briefing. An approach that becomes destabilized below 1000 feet above airport elevation in IMC or below 500 feet above airport elevation in VMC requires an immediate go-around.

1.17.2 The written procedures for Chitral lacked these professional inputs, which could have broken the chain of the Domino's theory of accident prevention.

1.18 Pilots' Performance. PIA has no regulations for the disposal of pilots displaying repeated irresponsible behaviour, which result in compromise on the safety standards. As displayed by the PIC/PF of AP-AUR, who was mildly admonished for a serious failing while taking off and aborting after V_R at

Multan. The same pilot has again been cleared to fly as a Captain despite the known fact that he displayed irresponsibility by flying under the influence of drugs, handled the aircraft so negligently that a serviceable aircraft has been written off and safety of 51 people on board the aircraft was jeopardised.

ANALYSIS

2.1 There are three possibilities, which caused the accident on landing and the hull loss. These are as follows:

2.1.1 Aircraft unserviceability in flaps, brakes and ground fine system.

2.1.2 Inadequate procedures for landing in Chitral and prevailing weather.

2.1.3 Cockpit crew's inability to land the aircraft.

2.2 **Aircraft Unserviceability** The assertion by the cockpit crew that flaps did not go from 26.5° to 40° when selected at 300 feet AGL is analysed in operational parameters difference between two settings and on the technical reports. The Vref for 26.5° flaps is only 05 kts higher than the Vref for 40° flaps. In addition, there is slight increase in pitch altitude with 40° flaps at same speeds. Therefore, these marginal changes in short finals parameters would result in slightly delayed touch down, if not corrected on noticing the 40° flaps unserviceability. Furthermore, 5 – 10 kts higher touch down shall increase the landing roll by 200 – 300 feet on a 5800 feet long runway. While at Chitral minimum runway length required to land F-27 is 3400 feet in performance charts. Therefore, flaps selection from 26.5° to 40° cannot cause a runway length excursion at 80 kts and more. The other possibility of runway excursion is unserviceable brakes and ground fine. The antiskid (Maxaret) malfunction may cause release of pneumatic brake pressure resulting complete

loss of braking. However, brakes can be regained manually by putting antiskid off, which was not done in this landing. Furthermore, the emergency brakes were also not used. The other reason for brakes not being effective is exceptionally high speed application of brakes when antiskid releases the pressure to prevent tire locking and excessive brake energy, which would result in complete loss of braking at lower speeds. The ground fine alone can stop the aircraft on a 5800 feet runway at normal landing speeds, however, if the ground fine is selected it comes on below 115 kts only. The CVR shows that ground fine did not come on. The damage pattern on the propellers also shows that ground fine was not available. The CVR and post flight inspections show that ground fine system was serviceable and available but not selected. The post accident technical investigations show that flaps and brakes system were also serviceable. Therefore, the runway excursion due to unserviceable flaps brakes and ground find is ruled out.

2.3 Weather / Inadequate Procedures The weather at the time of the mishap landing was CAVOK as reported by the Met. Furthermore, in adverse weather conditions the cockpit crew are to return to Peshawar as soon as adverse weather is observed on the flight.

2.4 The Chitral Approach and Landing Procedure does not give height, speed and configuration with reference to ground features, therefore, PIC follow their own references as learnt during training and adopted / practiced later during line operations. The major flaw in published procedure is clear directive "Do not execute an over shoot blow 500 AGL even with both engine power available". However, all pilots have been selecting 40° flaps at 300 AGL as recommended in FCOM. In such a scenario airmanship demands selection of landing configuration well before "Decision Height" for executing an over

shoot. The understanding of DH in IFR conditions for obstacle clearance cannot be applied to Chitral landing as a destabilized approach with 20 kts higher than V_{APP} speed would meet the 500 feet AGL (DH) parameters at 300 feet AGL overshoot.

2.5 It may be noted that PIC has been operative regularly at Chitral for last 7 – 8 years, therefore, inadequacies in procedures has not been the cause of accident.

2.6 **PIC's Inability to Land** This aspect has been analysed in the light of FDR and CVR extracts and PIC's pathological report after the accident.

2.7 The synchronization of FDR and CVR indicates that aircraft was higher than Landing Gears Lowering Speed one minute before touch down when at Decision Height 500 feet AGL in clean configuration. In preceding five minutes aircraft had remained at around 200 kts speeds during descent when 15° flaps should have been selected and at about 1500 feet AGL and Landing Gears (L/G) should have been lowered and 120 / 125 kts maintained. Lowering L/G and flaps below HD at 160 kts could not be salvaged. PIC himself reverted to 26.5° flaps after asking 40° flaps direct from 15° . The speed remained around 160 kts instead of 105 – 110 kts with 26.5° flaps. At about 200 feet AGL PIC acknowledged that a mess up had taken place, yet, he continued and touch down at 140 kts and 1000 down the runway. As panic had already resulted and caused decision paralyses, therefore, no attempt to go around was made, before touch down. After touch down the brakes did not work as antiskid released pneumatic brake pressure to prevent tire burst at high speed. The paralyses of decision led to inability to use emergency brakes or switch off antiskid and ground fine.

2.8 The pathological report indicated that PIC / PF was under the influence of Marijuana at the time of mishap landing. The

substance gives a false feeling of well being and over confidence leading to complacency, ignorance and inability to observe and comprehend surroundings. The loud music played in the cockpit and indifferent attitude to exceptionally high speed, incorrect landing configuration and inability to perform basic checks can only be attributed to PIC being under the influence of prohibited substance use.

2.9 In the light of foregoing it is concluded that PIC failed to monitor the aircraft parameters for landing due to the influence of Marijuana and landed at exceptionally high speeds 1000 feet down on a 5800 feet runway. The role of First Officer was also marginal as he lowered landing gears and flaps at DH on his own but failed to remind PIC of gross variation in a destabilized approach. The experience and seniority of PIC who is an instructor also might have prevented First Officer in highlighting the problems an approach / landing at Chitral. The socio cultural milieu of Pakistan does not allow correcting mistakes of senior / authority, especially in the cockpit as seen in number of other accidents where First Officer did not play their assigned role.

CONCLUSION

3.1 Findings

3.1.1. AP-AUR was serviceable for Islamabad–Peshawar–Chitral Sector and had 51 souls on board while landing at Chitral.

3.1.2. The PIC was Pilot Flying while landing at Chitral.

3.1.3. Enroute loud music was played in the cockpit while the volume was reduced two minutes short of landing.

3.1.4. Weather at Chitral was good for approach and landing.

3.1.5. The rates of descend of AP-AUR varied from 950 feet per minutes to 1500 feet per minute during various phases of flight between Lowari pass and Chitral on the mishap landing and the speeds maintained were exceptionally high.

3.1.6. Landing gears and flaps were lowered at far higher than recommended speeds only one minute before touch down. Normal landing flaps were not selected due to high speeds.

3.1.7. The PIC and the Co-pilot did not carry out the check list before landing at the appropriate time.

3.1.8. Approach was exceptionally high/ destabilised and touch down speed was 140 kts as against 95 – 100 kts.

3.1.9. Landing configuration was selected below Decision Height for go-around.

3.1.10. The aircraft touched down at 1000 feet down.

3.1.11. After landing, brakes became effective only few seconds before overrun due to high speeds and antiskid function. No attempt was made to use Emergency wheel brakes and Engine Braking (Ground Fine).

3.1.12. The main landing gears broke after going into unpaved area due uneven ground and the aircraft stopped after crossing over 5 nullahs before coming to a stop 479 feet from the end of the runway.

3.1.13. In the laboratory tests on the blood and the urine samples, taken after the accident, Captain Irfan Faiz tested positive for Marijuana and thus he is in violation of Rules 120, 220 (2), 237 (1), (2), 355 and 370 of CARs 94.

- 3.1.14. The Cockpit Crew did not speak the truth when they recorded their statements before the investigation team.
- 3.1.15. The PIC could not demonstrate his ability to determine, using the operating manual, the length of runway required to land a Fokker aircraft at Chitral with the actual set of conditions provided to him, though, he held instructor rating on F-27.
- 3.1.16. The Captain had aborted take off at Multan in 1998 after getting airborne, contrary to procedures, thus compromising the safety of passengers, crew and the aircraft. It was a serious incident that was dealt with mildly.
- 3.1.17. The accident resulted in a hull loss.
- 3.1.18. The PIC/PF has again been cleared to fly despite the fact that he was flying under the influence of marijuana, resulting in destruction of a serviceable aircraft and safety of 51 people on board was jeopardised.
- 3.1.19. The finalization of this investigation was inordinately delayed due to delays in down loading the CVR.
- 3.1.20. Although very meaningful information was revealed by the CVR readout, the CVR recording was of a very poor quality, which was due to lack of maintenance.
- 3.1.21. Chitral landing procedures, in spite of 40 years of operations are devoid of landing parameters for a visual approach and go around.
- 3.1.22. There are serious flaws in organization and execution of flight operations in "North Office PIAC". These flaws were not observed by Flight Standards as well.

3.2 **Cause of the Accident** Poor aircraft knowledge and irresponsibly piloting of the aircraft under the influence of drugs, which jeopardized the safety of the passengers /crew on board and destroyed a serviceable aircraft.

4. **RECOMMENDATIONS**

4.1 Written procedures for Northern Area are to be formulated, deliberated and test flown and CAA's approval should be taken. (Flight Operations)

4.2 Before approving any procedure, put up by an Operator, Flight Standard must scrutinize it thread bare in consultation with all available manuals, including adoption of special procedures where required / applicable.

4.3 Elements of a stabilize approach must be emphasised on all pilots periodically. (Flight Operations)

4.4 PIAC to identify places for timely CVR/FDR/DFDR down load from abroad when it cannot be done locally. The down loading of data should not exceeding 4/6 weeks and the investigator's presence at the down load site be ensured.

4.5 PIAC Flight Operations and Flight Standards, CAA to look into the deliberate violations of Rules 120, 220 (2), 237 (1), (2), 355 and 370 of CARs 94 by PIC which resulted in compromise on safety of passengers and hull Loss of F-27.