

FINAL INVESTIGATION REPORT



**ACCIDENT OF PIAC AIRCRAFT ATR 72-212A REG NO
AP-BKW AT JIAP KARACHI DURING GROUND RUN-UP
PERFORMANCE CHECKS ON 24 NOVEMBER 2018**

SCOPE

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The sole objective of the investigation of an accident or incident under above stated regulations is the prevention of future accidents and incidents of similar nature. It is not the purpose of such an investigation to apportion blame or liability. Accordingly, it is inappropriate that SIB reports should be used to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

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FINAL REPORT

ACCIDENT OF PIAC AIRCRAFT ATR 72-212A REG NO AP-BKW AT JIAP KARACHI DURING GROUND RUN-UP PERFORMANCE CHECKS ON 24 NOVEMBER 2018

Synopsis

On 24 November 2018 at JIAP Karachi, a Pakistan International Airlines Corporation (PIAC) aircraft ATR 72-212A Reg No AP-BKW was undergoing engines' performance ground run-up. The aircraft initially rolled rearwards for about 10 feet and then moved in forward direction. The aircraft after moving forward by about 450 feet, collided with two dormant aircraft of Shaheen Air International (SAI). The accident was reported to Safety Investigation Board (SIB) Pakistan by the operator through Mandatory Occurrence Report (MOR). Government of Pakistan (Aviation Division) issued memorandum and corrigendum authorizing SIB Pakistan to investigate the accident.

1. FACTUAL INFORMATION

1.1. **Description of Accident.** On 24 November 2018, PIAC aircraft ATR 72-212A Reg No AP-BKW, at JIAP Karachi, after both engines replacement and scheduled Check-A inspection, was undergoing engines' performance ground run-up, as a follow up of the completed maintenance. The aircraft was parked at engine run-up bay No 01. During engines' performance check at maximum reverse setting, the aircraft initially moved backward by about 10 feet and then, because of wrong selection of the engine controls, it started moving forward. The aircraft did not stop with parking brakes (already ON) as well as with the application of pedal brakes. The wheel chocks used during the activity were of smaller than the recommended size. The maintenance engineer could not control the situation and the aircraft continued forward movement. Its left wing tip first made contact with a dormant / parked aircraft (SAI B737-400, Reg No AP-BJT) between Captain and First Officer's windshield. After this it continued moving forward and hit the nose radome of another dormant / parked aircraft (SAI B-737-400, Reg No AP-BJU). Subsequently, the rotating No 1 Engine propeller got embedded into the fuselage of second parked aircraft, and it came to a stop after about 450 feet. The collision of AP-BKW with the two parked / dormant aircraft resulted in substantial structural damage. The aircraft last operated flight was PK-537 (Mohenjo-Daro to Karachi) on 31 August 2018 (84 days prior to this accident).

1.1.1. An overview of the accident site has been marked in the picture below:-





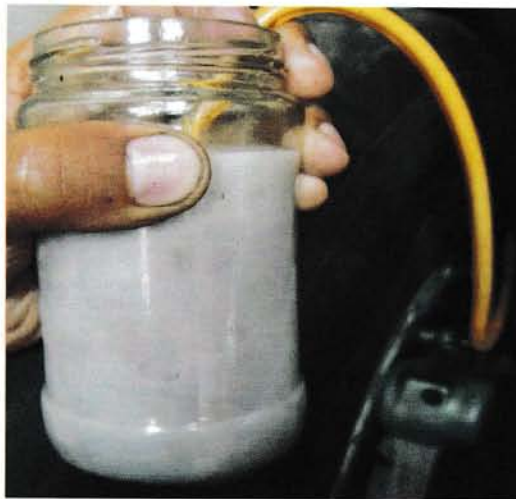
S No	Description of pictures given above
1 & 2	AP-BKW propeller No 1 embedded into fuselage of dormant AP-BJU
3	Inner ply of AP-BKW cockpit LHS # 3 window got shattered
4	Rubbing marks observed on fuselage of AP-BKW left hand side from captain aft windshield up to cabin window # 11
5	Left wing tip of AP-BKW which made first contact with AP-BJU

Aircraft Make & Model	ATR72-212A
Registration Marking	AP-BKW
Manufacturer Serial No.	1036
Year of Manufacture	July, 2012
C of A (expiry date)	29/06/2019
Weekly Check inspection	31/08/18 at Islamabad (ISB)
Pre Flight Check	31/08/18 at Mohenjo-Daro (MJD)
Total Aircraft Hours	9619:15
Total Aircraft cycles	7338
Total Landings	7338

- 1.7.1. **Information on the Removed Components.** Not applicable.
- 1.8. **Meteorological Information.** There was no contribution of weather towards the accident. The weather at the time of accident was within permissible limits for safe conduct of ground run-up.
- 1.9. **Aids to Navigation.** Not applicable.
- 1.10. **Communications.** Not applicable.
- 1.11. **Aerodrome Information.** Not applicable.
- 1.12. **Flight Recorders.** CVR & Solid State FDR data were downloaded and used as reference for investigation and analysis purposes.

2. ANALYSIS

- 2.1 The aircraft was grounded since 31 August 2018 primarily for Check-A maintenance which is accomplished after every 500 flight hours (refer Maintenance Planning Document (MPD)). This maintenance activity generally takes 02 working days, however during this grounding of AP-BKW, its major components including brake assemblies, engines & propellers etc were cannibalized to service deficiencies on other aircraft.
- 2.2 Whenever any major component pertaining hydraulic system is removed, air goes into the hydraulic lines due to bleeding out of hydraulic fluid. Accordingly, once the hydraulic component is installed back, the trapped air in the hydraulic lines is required to be taken out so that the hydraulic system / components perform their intended functions.
- 2.3 After completion of Check-A maintenance, as part of recovery plan, all the removed components including brake assemblies, engines and propellers etc were installed back. During this process, the important task of brakes High Pressure (HP) line bleeding / purging was essentially required as per JIC 32-42-00-BLD-10010. According to the Aircraft Technical Log Book (ATLB) the said task was undertaken prior to towing of the aircraft / engines run-up etc. ATLB contains documentation of following activities related to the said task.
 - 2.3.1 Page-32-33 dated 10/11/18 ***“brake assembly HP bleeding to be carried out”***
 - 2.3.2 Page-51 dated 23/11/18 ***“brake assembly operational check of normal braking to be carried out”***
- 2.4 The mentioned bleeding / purging of the brake system after the said maintenance was either not performed at all or it was performed in an inadequate manner, and it led to brake failure during engine ground run-up checks.
- 2.5 FDR was downloaded. The brake pressure throughout engine performance run-up was recorded between 39-45 psi, whereas it was required to be 3000 psi this supports the fact that there was no or very little hydraulic in brake system thus resulting in its in-effectiveness (for both normal and emergency operation). FDR data screen snapshot is as shown below: -



2.8. Engine ground run-up permission was requested for 15 min.

- 2.13 The wheel chocks used during the ground run-up checks were smaller than the recommended ones, were used only in front of the wheels and not at the back side of the wheels, and were and therefore did not serve the purpose.
- 2.14 During first ground run-up, TCAS defect was observed. Consequently, the B2 aircraft engineer (sitting on FO seat) left the cockpit for referring Trouble Shooting Manual (TSM).
- 2.15 During second engine ground run-up, upon selection of Power Lever for reverse position, the aircraft moved backwards for about 10 feet (owing to ineffectiveness of brakes and no chocks at the back of main wheels).
- 2.16 The operating ground crew (being in panic) moved Power Levers (PL) to Flight Idle (FI) instead of moving that to Ground Idle (GI) or moving Condition Lever to Fuel Shut Off position. This wrong selection of the PL at FI generated enough thrust to move the aircraft in forward direction.



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3. OBSERVATION

- 3.1 For the conduct of ground run-up of ATR aircraft, PIAC has incorporated a procedure. Out the pool of available, qualified and experienced maintenance engineers, few are selected and after a process (including theoretical tests / interviews and related paper work) are issued by PIAC QA with an authorization / permit to conduct ground run-up of ATR aircraft. It has been observed that this authorization (for such a critical and important activity / task) is issued without any practical tests / evaluation, conducted on the aircraft to assess the individual's competence.

4. CONCLUSIONS

4.1 Findings.

- 4.1.1 The aircraft was grounded on 31 August 2018 (since last 84 days) primarily for Check 'A' maintenance which takes generally 02 working days to complete.
- 4.1.2 During this grounding of the aircraft, components including engines, propellers and brake assemblies etc were taken out to fill up deficiencies on other aircraft in PIAC.

4.2 Causes of Occurrence. The occurrence was caused due to: -

- 4.2.1 Non-adherence to the laid down maintenance procedures by PIAC – in which important task of bleeding / purging of brake system was either not performed or was performed in an inadequate manner.
- 4.2.2 Deficiency in required maintenance support equipment at the organization level – in which recommended wheel chocks were not procured and therefore were not available for use.
- 4.2.3 Lack of professionalism of maintenance crew of PIAC – in which the maintenance engineer was unable to judge situation correctly and could not initiate a corrective action at an early stage.
- 4.2.4 Inadequate assessment