

FINAL INVESTIGATION REPORT



SERIOUS INCIDENT OF M/S. PRINCELY JETS FLIGHT
PJP-786 EC130-B4 AIRBUS HELICOPTER
REG NO. AP-BKH ON 12-01-2018

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SERIOUS INCIDENT OF M/S. PRINCELY JETS FLIGHT PJP-786 EC130-B4 AIRBUS HELICOPTER REG NO. AP-BKH (SECTOR BANI GALA – SIAL SHARIF) ON 12-01-2018

Synopsis

The serious incident was reported to Safety Investigation Board (SIB), Pakistan through Mandatory Occurrence Report (MOR) (**Appendix 'A'**). The incident was notified in accordance with ICAO Annex-13 (**Appendix 'B'**). Aviation Division, Government of Pakistan issued memorandum vide letter No. HQCAA/1901/404/SIB/051 dated 22nd January, 2018 (**Appendix 'C'**) authorizing SIB, Pakistan to investigate the incident and investigation was conducted by SIB. M/s. Princely Jets' Helicopter EC130-B4 (AP-BKH) made precautionary landing on Mandra – Chakwal Road due to servo and hydraulic caution light illuminated coupled with burning smell and smoke in the cockpit. Post flight inspection found that the right hand hydraulic system belt was broken.

1. FACTUAL INFORMATION

- 1.1 **History of the Flight.** M/s. Princely Jets' Helicopter EC130-B4 made precautionary landing on Mandra – Chakwal Road due to servo and hydraulic caution light illuminated coupled with burning smell and smoke in the cockpit. Post flight inspection found that the right hand hydraulic system belt was broken.
- 1.2 **Injuries to Persons.** There were no injuries to any person during the incident.
- 1.3 **Damage to Aircraft.** None.
- 1.4 **Other Damages.** None.
- 1.5 **Personnel information.** Not applicable.
- 1.6 **Aircraft and Engines Information.**

Aircraft Make & Model	EC-130 B4
Registration Marking	AP-BKH
Manufacturer Serial No.	7325
Year of Manufacture	2012
C of A (S No. , expiry date)	S/N (S No. 6, 07/06/2018)
Maintenance review prior to 12 th January, 2018 (date, hrs, cycles, expiry date)	15/11/2017; AFH 1001:18; Cycles 1219; Expiry Date: 15/05/2018
Daily inspection prior to 12 th January, 2018 occurrence (date, location)	12/01/2018 – Abbottabad
Transit check prior to 12 th January, 2018 occurrence (date, location)	12/01/2018 – Islamabad
Total Aircraft Hours as on 12 th January, 2018 (prior to occurrence)	1043:43
Total aircraft cycles as on 12 th January, 2018 (prior to occurrence)	1284

Total Landings as on 12 th January, 2018 (prior to occurrence)	1742
Last Check-C (type, date, hrs, cycles, agency performed & location) prior to occurrence	150 FH/12M 04/06/2018 AFH 918:28 Cycles: 1092; Princely Jets; At Islamabad
Last Check-A (type, date, hrs, cycles, agency performed & location) prior to Occurrence	600 FH/24M; 08/06/2016; AFH 754:58; Cycles 833; Princely Jets; At Islamabad

1.6.1 Following components were removed from AP-BKH after the reported incident :-

Component Noun	Part No. / NSN / S No.	Previously Installed on AP-BKH on date	Hrs flown since installation	Manufacturer's Name	Date of Manufacturing	Total AF Hrs flown
Hyd Pump	704A3431- 0004 S/N103651 07	24/10/2011	1043:43	HPI	-	1043: 43
Hyd Pump Drive Assy	350A3501 3200 S/N2-9188 11-10	19/07/2013	824:00	MGP/AP	-	1043: 43
Belt Poly 'V'	597K4	19/07/2013	824:00	Hutchinson	-	1043: 43

1.6.2 The aircraft was maintained in accordance with approved maintenance schedule.

1.7 **Meteorological Information.** On 12th January, 2018, the weather at the time of incident are as follows :-

Outlook	Visibility	Clouds	Wind	Temp	QNH
Fair	8 Km	SKC (Sky Clear)	CALM	39° C	1005

1.8 **Aids to Navigation.** Not Applicable.

1.9 **Communications.** Not Applicable.

1.10 **Aerodrome Information.** Not Applicable.

1.11 **Flight Recorders.** Not Applicable.

1.12 **Wreckage and Impact Information.** Not Applicable.

1.13 **Medical and Pathological Information.** Not Applicable.

1.14 **Fire.** No fire was reported by the cockpit crew members.

1.15 **Survival Aspects.** Not Applicable.

1.16 **Test and Research.** Not Applicable.

1.17 **Organisational and Management Information.** Not Applicable.

1.18 **Additional Information.** Not Applicable.

1.19 **ATC Tape Extracts.** Not Applicable.

1.20 **Use of Effective Investigation Techniques.** Standard investigation procedure and

2. ANALYSIS

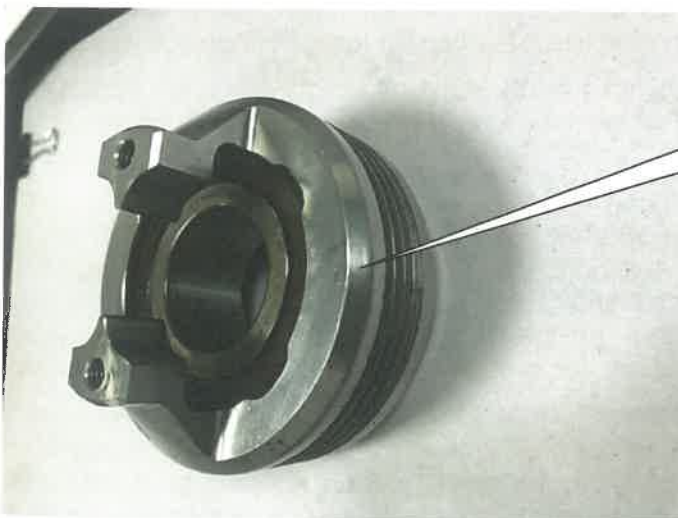
2.1 Technical Analysis

- 2.1.1 An initial survey at the site revealed no damage to the helicopter except broken Belt of the hydraulic pump.



Broken Belt of the Hydraulic Pump

- 2.1.2 Accordingly, the Hydraulic pump and the belt were replaced by the operator in accordance with the OEM's laid down procedure to make the helicopter serviceable.
- 2.1.3 An analysis of the Hydraulic Pump Drive Assembly (Part No. 350A35-0132-00) revealed that the bearing (Part No. 704A33-651-243) seems to have been ceased.



Pump Drive Assembly and its Bearing

- 2.1.4 This Pump drive Assembly bearing and the broken Belt were sent to its OEM (Airbus Helicopters, France) for further investigation and analysis.

- 2.1.5 The OEM conducted a detailed tear down examination of the dispatched exhibits and

"The analysis confirms the behavior of this bearing which was POST MOD 07-9566 (P/N 704A33-651-243) but PRE MOD 07-9568 (P/N 704A33-651-269). This kind of incident was explained by all the investigations which were performed following the first events. The limited internal clearance of the bearing associated with environmental conditions generates abnormal heating of the rolling bodies and a deterioration of the grease which leads to the bearing seizing and the belt failure".

- 2.1.6 The investigation report from the OEM explains that such failures have been faced by many other customers in the industry. Main reason for this failure is the in-adequacies of the design of Bearing (lesser clearance etc) which has already been improved thru various modifications. The latest modification (MOD 07-9568) had already been advised to the customers.
- 2.1.7 It is worth mentioning here that this Helicopter is equipped with a double hydraulic system for which the OEM has recommended:
"SB No. EC130-63-009A in order to replace the bearing of the hydraulic pump drive. In accordance with the classification, the SB is only recommended but it is better to apply it in order to avoid this kind of incident in the future".
- 2.1.8 In the light of abovementioned OEM's SB, replacement of the bearing under discussion was not mandatory for all those aircraft which were equipped with a double hydraulic system. Consequently, the operator didn't replace the Bearing with its latest variant.
- 2.1.9 In the light of established facts about the sequence of events encountered by this flight, the smoke in cockpit was due to burning of the V-Belt as a consequence of bearing cessation.

3. CONCLUSION

3.1 Findings

- 3.2 There was no damage to the helicopter except a broken belt of the hydraulic pump.
- 3.3 The Bearing of Hydraulic Pump drive Assembly was found ceased.
- 3.4 This Pump drive Assembly bearing and the broken Belt were sent to its OEM (Airbus Helicopters, France) for further investigation and analysis.
- 3.5 The OEM conducted a detailed tear down examination of the dispatched exhibits and rendered a technical analysis report (**Appendix 'D'**). Salient findings of this OEM report are as mentioned below :-

"The analysis confirms the behavior of this bearing which was POST MOD 07-9566 (P/N 704A33-651-243) but PRE MOD 07-9568 (P/N 704A33-651-269). This kind of incident was explained by all the investigations which were performed following the first events. The limited internal clearance of the bearing associated with environmental conditions generates abnormal heating of the rolling bodies and a deterioration of the grease which leads to the bearing seizing and the belt failure".

- 3.6 The investigation report from the OEM explains that such failures have been faced by many other customers in the industry. Main reason for this failure is the in-adequacies of the design of Bearing (lesser clearance etc) which has already been improved thru various modifications. The latest modification (MOD 07-9568) had already been advised to the customers.
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- 3.8 In the light of abovementioned OEM's SB, replacement of the bearing under discussion was not mandatory for all those aircraft which were equipped with a double hydraulic system. Consequently, the operator didn't replace the Bearing with its latest variant.
- 3.9 In the light of established facts about the sequence of events encountered by this flight, the smoke in cockpit was due to burning of the V-Belt as a consequence of bearing cessation.
- 3.10 **Cause of the Occurrence.**
- 3.10.1 In-adequacies in the design of Bearing inside the Hydraulic Pump Drive Assembly caused it to cease which lead to breakage of the Belt.

4. SAFETY RECOMMENDATIONS

- 4.1 Although, this model of the helicopter is equipped with a double hydraulic system and replacement of the bearing is not mandatory, however the operator (M/s Princely Jets) is recommended to implement SB No. EC130-63-009A in order to replace the bearing of the hydraulic pump to avoid recurrence in future.