FINAL REPORT OF ACCIDENT TO KING AIR C90A AIRCRAFT VT-KPC AT PUNE AIRPORT ON 07th SEP. 2012

1. Aircraft		
Type	:	King Air
Model	:	C90A
Nationality	:	INDIAN
Registration	:	VT-KPC
Owner and Operator	:	M/s Finolex Industries Limited
2. Date of Accident	:	07.09.2012
3. Time	:	20 :08 hrs.
4. Last point of Departure	:	Pune
5. Point of intended landing	:	Pune
6. Geographical location of Accident (Lat. Long)	:	18°34'57''N 073°55'13''E
7. Type of operation	:	Practice Flight (Circuit & landings).
8. Phase of operation	:	Landing
9. Type of Accident	:	Undershoot, Non-fatal
10. Commander's License	:	ATPL
11.Damage to aircraft	:	Substantial

SUMMARY

The aircraft under the command of an ATPL holder took off from runway 28 for circuits and landings. After take-off, aircraft did circuit at 3500 feet for visual approach. Pilots lost contact with the runway in the first circuit. They were guided by the base radar and positioned on finals after one more circuit. At 3000-3500 feet aircraft was stabilized on approach with landing gears down and locked. Approach flaps had been selected on base leg. Descent was started after visual contact. Aircraft was high on approach initially. Thereafter aircraft progressively came below the glide slope and undershot the runway by 880 feet from the threshold of the runway 28 and got substantially damaged. The occupants came out of the aircraft of their own. There was no injury to anybody. There was no fire. There were no symptoms of approach of Stall. Aircraft was fully serviceable and refuelled before flight. Weather was within minima.

1. FACTUAL INFORMATION:

1.1 HISTORY OF THE FLIGHT

On 7th September 2012, at 0500 hrs IST, Capt. 'A' an ATPL holder with the company was informed about the schedule of the flight (circuits and landings) in the evening on the same day i.e. 07.09.2012 by company's operations person. He reported at airport to undertake the flight at 1830 IST. As per the pilot full fuel of 2400 lbs ie.1200 lbs in each tank was carried on board.

The company had arranged another very experienced pilot Capt. 'B' (ATPL holder with restrictions to utilize privileges of PPL only) working with different private operator Bellary Iron Ore (P) Ltd. to fly with Capt. 'A'. Capt. 'A' was with M/s Finolex from Aug 1993 to Nov 1994 and had flown 390 hours (approx.) on King Air C-90 aircraft. As per the log book of the pilot during this period, he had flown about 114 hrs as P1 on King Air C-90 which included about 15:00 night hrs. Capt. 'A' had rejoined the company and flew for 03:55 hrs. on 26.8.2012 on King Air. As per him, he had requested the company to arrange for an instructor / experienced safety pilot and the practice flight was planned as he thought that he would benefit from Capt. 'B's vast experience and it will enhance his own experience towards flying the aircraft.

Capt. 'B' had reached Pune about 1800 hrs. on 07.09.2012 and as per him he had enough rest before the flight. He also stated that his role in the aircraft was as observer and a safety pilot and to operate R/T during the flight. As Capt. 'A' was meeting Capt. 'B' for the first time, Capt. 'B' informed that he has over 4000 hrs of flying experience on King Air C-90 and that he was quite familiar with layout of the airfield at Pune. Both the pilots then conducted a small briefing about the conduct of flight i.e. circuits and landing.

Capt. 'A' has stated that, Capt. 'B' told him that he (Capt. 'B') always occupied the right seat and though the flight plan reflected Capt.

'B' as PIC, but as Capt. 'B' was occupying the right seat, he occupied the left seat. The flight plan was filed by Manager (operations) which was signed by Capt. 'A' and as per the flight plan Capt. 'B' was the PIC. Manager (Operations) has stated that at the time of filing the flight plan, he was not aware of the fact that Capt. 'B''s licence privileges were restricted to PPL but after he arrived from Bangalore, he showed his license to Manager, Operations.

Met forecast and NOTAMs were obtained on telephone. The aircraft took off with Capt. 'A' (PF & PIC) occupying the left seat and right hand seat was occupied by Capt. 'B' (PNF & P_2).

After IR Check, during day, this was Pilot's first night flight on this type of aircraft. The R/T was handled by pilot occupying right hand seat. There was another CPL holder (with King Air C-90 A endorsement) occupying a passenger seat on board the aircraft. He (the CPL holder) and Capt. 'A' were supposed to fly to Ratnagiri the next day.

As per the ATC tape transcript, the aircraft had informed tower that "we are starting motors for practice flying". It was also informed that they would like to do some circuits. The aircraft took off from runway 28. The circuit altitude given to the aircraft was 3500 feet. Other information passed to the aircraft was to carry out right hand pattern for runway 28.

The aircraft was instructed by the tower controller (123.5 MHz) to report right hand downwind for runway 28. On reporting downwind, it was instructed to report finals for runway 28. Tower was informed by the aircraft that they would be landing on runway 28 and then backtracking for another departure. While turning from base leg towards finals on R/W 28, pilots lost contact with the runway, overshot the turn, therefore, requested for radar Vectors. The aircraft was therefore handed over to Pune RADAR (118.8 MHz) for providing vectors. Aircraft was not correctly positioned; therefore, it was vectored by the Radar for another approach.

Once the aircraft reached 3500 feet, it was vectored for visual (2^{nd}) approach. The aircraft was given position reports when it was at 4.5 NM and 3.5 NM. At 3000-3500 feet aircraft was stabilized on approach with

landing gears down and locked. Approach flaps had been selected on base leg. Runway was visual at 3 miles from the touchdown where the aircraft was on PAPI of R/W 28 with 2 red and 2 white lights in sight.

As per Capt. 'A' till this stage he was flying the aircraft as sole manipulator of the controls. At this stage, as per him, Capt. 'B' dropped his hand held mike and while looking for it with his right hand he had also very firmly held the controls column with the left hand. Further Capt. 'A' has stated that after this Capt. 'B' was at the control and he (the pilot) was observing approach, flare and touch down since this was their first approach and landing.

When runway was in sight, full flaps were lowered. The aircraft was cleared for visual approach, once it has reported runway in sight. The aircraft was then handed over to tower on 123.5 MHz. The aircraft was given clearance to land after sighting of the aircraft by tower. The surface winds (240/09 knots) were passed along with caution for wet runway surface condition. There was no acknowledgement from the aircraft.

Till the time Pilot reported contact with the runway, Radar had not given descent to the aircraft. Descent was started after visual contact therefore aircraft was high on approach at that stage. Thereafter aircraft progressively came below the glide slope.

The aircraft undershot the runway by 880 feet from the threshold of the runway 28, making first contact on kutcha. At the first point of contact on the ground, due to impact, both LH & RH main landing gears of the aircraft got detached from the aircraft structure. Nose gear bent inside the aircraft. The aircraft landed on its belly on kutcha (Soft Ground Arrester) and skidded to the concrete undershoot area.

In the meantime, runway controller informed the rescue services that aircraft had crash landed at undershoot area of runway 28. At the same time pilot also responded that they have touched short of runway. The occupants have come out of the aircraft of their own. There was no injury to anybody. Primary alarm was activated and CFT 1 after reaching

crash site reported that occupants were safe. There was no fire. Pilots were examined after the accident and were found medically fit.

1.2 INJURIES TO PERSONS:

INJURIES	CREW	PASSENGERS	OTHERS
FATAL	-	-	-
SERIOUS	-	-	-
MINOR/NONE	2	1	

1.3 DAMAGE TO AIRCRAFT:

The aircraft was substantially damaged. Major damages were:

1. Blades of propellers of both the engines were found bent in inward direction.
2. Intake and bottom cowling of both LH &RH engines were found crushed and severely damaged.
3. Nose landing gear door hinges got sheared off and the door was hanging on these damaged hinges.
4. Nose landing gear collapsed & found folded rearwards beneath the aircraft belly.
5. Aircraft nose on RH side (behind Radome) was found severely damaged.
6. Bottom surface of fuselage & wing inter section area bottom surface damaged due scratching on concrete ground.
7. Out board flaps on both port and starboard side damaged due impact and scraping.
8. The inboard flaps were found detached and lying at 256feet away from the RH side wing tip of the final position of the aircraft.
9. RH horizontal stabilizer's tip portion had impact damages.
10. Skin on the LHS of fuselage tail behind static port had crippled
11. Cabin entrance door found buckled.
12. Both the engines nacelle top surface skin was found buckled.

13. Fuel spillage was observed from bottom of the LH & RH nacelle fuel tanks.
14. Main landing gear door (two pieces), LH & RH main landing gear top brace assembly (cylinder), RH& LH MLG lower strut (piston) along with wheel & brake assembly, NLG shimmy damper along with bracket, Inboard flaps, bottom of V.H.F antenna and other small pieces of aircraft debris were found scattered in the dust patch area.
15. The balusters had punctured the bottom surface of the outboard wing just midway between the forward & rear spar and also possibly tearing into the inboard trailing edge of the inboard flaps.

1.4 OTHER DAMAGE

There was negligible damage to the airstrip as the airplane had made contact with the edge of the ramp of the runway, where a perimeter road of 4metres width runs, however the balusters (iron angles) were bent due to the impact with the airplane.

1.5 PERSONNEL INFORMATION

PARTICULARS	Pilot on Left Hand Seat
Name	ALTP holder with open rating upto 5700 kgs
Age	58 YEARS
License	ALTP HOLDER
Date of Issue	21-10-1991
Valid upto	20-01-2014
Endorsement as PIC	C90, A310, B 777, OPEN RATED
Date of medical exam	17-05-2012
Med Exam Validity	16-11-2012
FRTOL LICENSE Valid up to	20-01-2013
RTR (A)Validity	18-11-2030

Total flying experience	11400 hrs
Experience on type	385 hrs
Experience as PIC on type	114 HOURS IN 1993/94. 03:55 IN AUG 2012
Last flown on type	26 AUG 2012
Total flying exp. in last 180 days	B777 : 210 HOURS
90 DAYS	B777: 78 HOURS
30 DAYS	King Air C90 : 4:33 HOURS (3:55 Day)
07 DAYS	38 min.
24 HOURS	38 min.

PARTICULARS	**Pilot on Right Hand Seat**
Name	ALTP holder with open rating upto 5700 kgs
Age	67 YEARS
License	ALTP (License degraded to PPL due to Age above 65)
Date of Issue	31.12.1981
Valid upto	14.02.2014
Endorsement as PIC	Navion,pushpak,Tiger moth, King air C90,B100
Date of medical exam	05-06-2012
Med Exam Validity	04-12-2012
FRTOL LICENSE Valid up to	14-02-2017
RTR (A)Validity	11-05-2030

The pilot occupying Right hand side seat was having more than 16000 hrs. of experience out of which more than 4000 hrs. were on King Air C 90 aircraft. As per the photocopy of pages of log book provided by the operator he has flown only 18:40 hrs. between 30.1.12 and 20.8.12. There is no record indicating that he has flown between 21.8.12 and 7.9.12.

1.6 AIRCRAFT INFORMATION

C of A of the aircraft King Air C-90 was initially revalidated on the strength of export C of A (E 295421) dated 18.6.2005 issued by FAA, USA. Indian C of A No. 2668 in "Normal" category with "private" sub division was issued on 21.7.2005 and was valid till 17.6.2006. As per the C of A the aircraft the minimum crew necessary for the aircraft was "one".

i. Aircraft: - Beech King Air C-90A
ii. Aircraft Registration: VT-KPC
iii. C of A: C of A Renewed from 22nd June 2012 to 21st October 2013. ARC extended from 22nd June 2012 to 21st June 2013.
iv. C of R: Registration no. 3259 dated 21st July 2005
v. Wt. Schedule: Aircraft weighing carried out on 15th October 2008 at Air Works (I) Engg. Pvt. Ltd., Mumbai. Next weighing due on 15th October 2013.
vi. Engine Type: P& WC PT6A-21
vii. Engine Sl No. : LH S/No. PCE PE 0523, RH S/No. PCE PE 0522
viii. MSN Sl. No. : LJ – 1696
ix. Year of Manufacture: 2003
x. Category: Normal, Sub-Division: Private
xi. Max AUW: 4581.00 Kgs
xii. Aircraft Hours (Since New): 1782.00 Hrs
xiii. Engine Hours (Since New): LH Engine Hours: - 1782.00 / RH Engine Hours: - 1782.00
xiv. Aircraft Station: Pune.
xv. Last Major inspections Carried out on this Aircraft: Phase 1 and Phase 2 Inspection Schedule carried out on 21st June 2012

1.7 METEOROLOGICAL INFORMATION

As per METAR Reports:

At 1900 IST:

210 / 06 knots 5000 RA SCT 015 SCT 020 BKN 080 2424 QNH 1008 TEMPO 3000 RA

At 2000 IST:

210 / 05 knots 5000 RA Few 010 SCT 015 BKN 080 2424 QNH 1008 TEMPO 3000 RA

At the time of Accident:

Drizzle and Winds 260/08 knots

1.8 AIDS TO NAVIGATION

The Pune airfield is a defence airfield with tower frequency 123.5and approach frequency of 122.7. The following navigation facilities were available at the time of accident.

NDB	PO 381 (183440N 735444E) 2.8 KW 261/ 1.4 NM R/W28
VOR/DME	PUN 113.9 (183447N 735451E)
PAPI	ASA 2.6 for R/W 10 R/W 28 (Right Hand Only)

1.9 COMMUNICATION

There was uninterrupted communication between crew and ATC/Radar. The crew has not reported any problem in communicating with ATC.

1.10 AERODROME INFORMATION

The Pune Aerodrome is IAF Cat A, Class 1 Grade 'A' airfield. The ARP is located at approximately 300 feet in front of ATC Tower. The elevation of ARP is 1942 feet, of dumbbell (10) is 1912 feet and of dumbbell (28) is 1924 feet. It is a joint use international aerodrome with operations on 24 hours basis.

There is only one runway with magnetic heading as 096º/276º. The runway designation is 10/28. It is 8355 feet long and 150 feet wide. The runway markings are as per ICAO standards given in Annexure 14. Details of runway surface are as follows:

Runway 28

First 1313 feet is concrete (rigid), next 6313 feet is asphalted concrete (flexible) and last 729 feet is concrete (rigid). It has also got 528.55 feet concrete overrun followed by 294 feet soft ground arrester (without shoulders). SGA width includes 14 feet tar road on both sides and there is steep fall on three sides. PCN for flexible portion is 57/F/B/X/T and of rigid portion is 41/R/B/X/T.

Runway 10

First 729 feet is concrete (rigid), next 6313 feet is asphalted concrete (flexible) and last 729 feet is concrete (rigid). It has also got 559.7 feet concrete overrun followed by 294 feet soft ground arrester (without shoulders). SGA width includes 14 feet tar road on both sides and there is steep fall on three sides. PCN for flexible portion is 57/F/B/X/T and of rigid portion is 41/R/B/X/T.

The declared distances are as follows:

	TORA	TODA	ASDA	LDA
RW 10	8100 ft.	8900 ft.	8600 ft.	8300 ft.
RW 28	8100 ft.	8900 ft.	8600 ft.	8300 ft.

Lighting: OWL lighting system is provided on the aerodrome as follows:-

(a) RWY edge three aspect lights for main runway (10 / 28).
(b) RWY edge omni lights with blue filter for secondary runway (14/| 32).
(c) Omni lights with blue filter for Parallel Taxi Track (PTT).

(d) A culvert centre line and cross bar (three bars) lights for runway 28. Five lead in lights provided for runway 10.

(e) PAPI is provided on right shoulders of runway 28 & 10. The PAPI is set for a 2.6º (2 degrees & 36 minutes) Glide Path.

1.11 FLIGHT RECORDERS

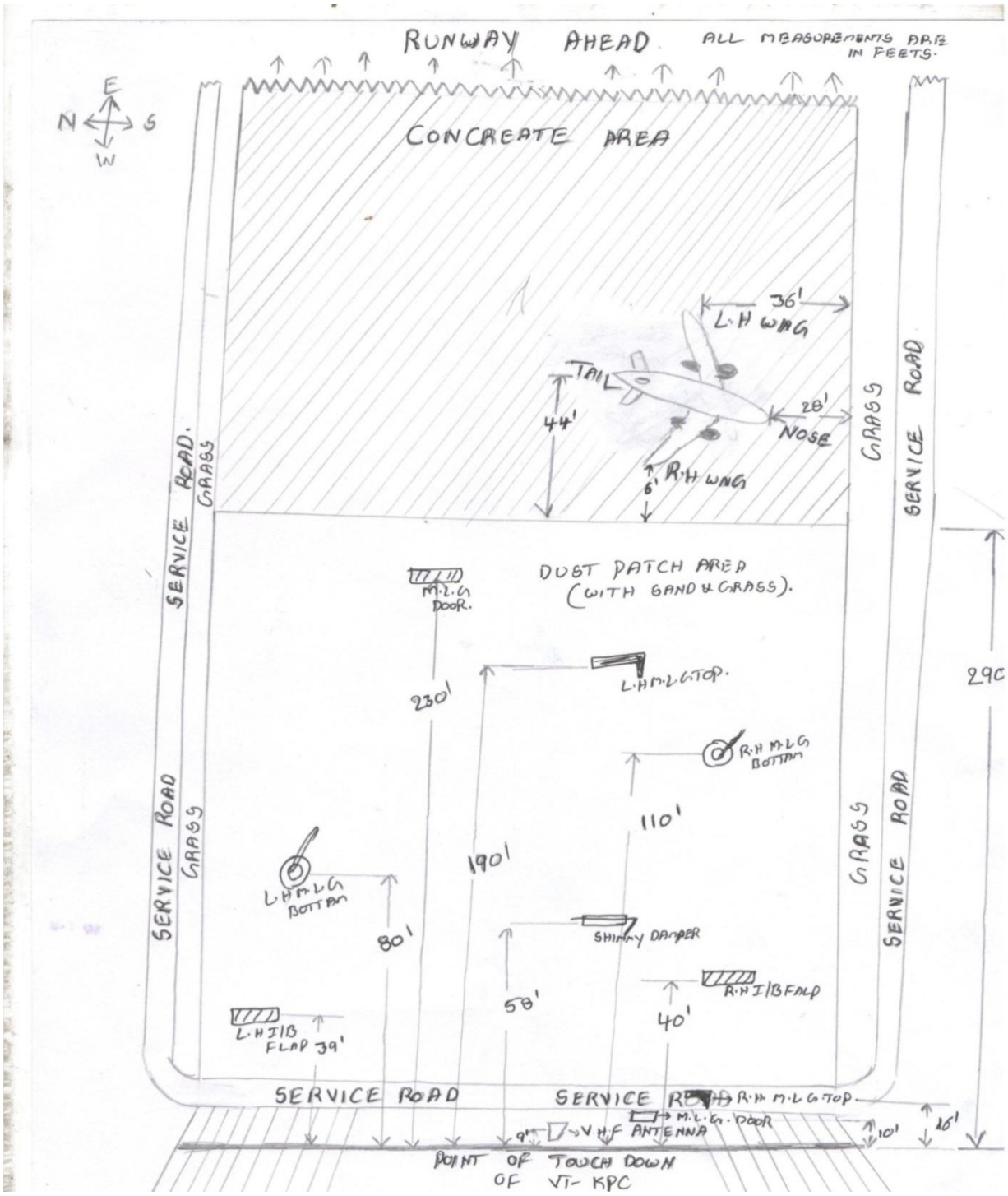
The aircraft was equipped with CVR and the CVR replay was carried out. FDR was neither required nor fitted on the aircraft.

1.12 WRECKAGE AND IMPACT INFORMATION

The first point of impact was the edge of the ramp of Runway 28. The ramp edge has a fall of approximately 23-25 metres. The PAPI lights are located ahead of the edge of the ramp of the runway. The perimeter road has iron L- section angles on the edge of the ramp. Further there exists the safety area, followed by the arrester nets and from thereon is the beginning of Runway 28. The airplane nose wheel made first physical contact with the ground on the edge of the ramp of Runway 28. This is indicated by an impression of the nose & the main wheels gears on the edge & the slope portion of the ramp respectively.

The next in line of impact was the balusters on the perimeter road that pierced both the outboard wings just outboard of the nacelles between the front & rear spars, at which time the Main wheels hit the slope of the ramp and probably the airplane bounced a bit over the perimeter road as, there were no impressions of contact across the width of the perimeter road. The outboard flap also has impact & pierced damage towards the inboard trailing edge.

After the Main Landing gear got detached the bottom of the fuselage skin made contact with the overrun section of the runway, wherein all the antennae affixed to the belly of the fuselage were torn off & flung rearwards.



Wreckage Diagram of Accident Site

1.13 MEDICAL AND PATHOLOGICAL INFORMATION

The PIC of the accident flight Capt. 'A' was subjected to medical tests after the accident. There was no abnormality and the BA test was negative.

1.14 FIRE

There was no Fire.

1.15 SURVIVAL ASPECTS

All the occupants have come out of the aircraft of their own. The accident was survivable.

1.16 TESTS AND RESEARCH

Nil

1.17 ORGANISATIONAL AND MANAGEMENT INFORMATION

The aircraft was owned and operated by Finolex Industries Limited. The company was operating as a private operator. In addition to the pilots, there was one person in the operations department, who had retired from IAF (ATC Branch) and was acting as Manager (Operations). In the company he was carrying out liaison work for the operation of aircraft and was working under direct supervision of the pilots. He became aware of the DGCA requirements while working with the company. As per him for any training/ practice flying, Chief pilot used to take decisions. The operations manager has stated that the chain of command in the organisation was Chairman → MD Aviation → Chief Pilot → Co-Pilot → Operation Manager.

He has further stated that Capt. 'B''s role was confined to that of observer and to assist the pilot as Co-pilot for handling R/T.

The company had, as per the receipt, though submitted the Operations Manual but it was not approved.

Pilot who was flying this particular aircraft before Capt. 'A' joined, had left the company in May 2012. He was an instructor/examiner on King Air C-90. Capt. 'A' who has retired from Air India, was hired by the company for the purpose of flying King Air C-90. Capt. 'A' has flown King Air C-90 with the company prior to joining Air India. As per the instructor/ examiner he has imparted renewal training on King Air C-90 to Capt. 'A' as per the AIC 3 of 1985 on the subject. On completion of training the licence of Capt. 'A' was submitted to DGCA and Instrument Rating was endorsed on his licence for King Air C-90.

As per the DGCA Mumbai Office, Last renewal of ATPL was carried out on 08.12.2011 and ATPL was renewed from 21.01.2012 to 20.01.2014. IR was also renewed on 08.12.2011 from 05.12.2011 to 04.12.2012.

As per manager (operations), Capt. 'B' was not paid any remuneration or any other amount, though Company had offered to bear his journey and accommodation expenditure. Manager (Operations) has also stated that "Capt. 'A' has joined the company after his retirement from Air India where he was flying B-777 and Airbus aircraft. Capt. 'A' was earlier with the company from August 1993 to November 1994. He has flown for 390:20 hrs. On King Air C-90 during that period. This was the system with the company that for a newly joined pilot, the company was providing assistance (by another experienced pilot) from the right hand seat for R/T and other observation and normally the right seat was occupied by an experienced pilot. Secondly pilot had joined Finolex after a gap of more than 17 years during which he had flown bigger transport aircraft, Operations department decided to have experienced pilot on right seat for a few local sorties. Capt. 'B' who was having good experience on King Air C-90 was requested for the above."

The original licences and medical of Capt. 'B' were not provided and on query the Manager Operations has stated that, "On arrival from Bangalore on 7th Sept. 2012, Capt. 'B' has shown me his licence and other

documents. I do not know why he has not produced the same to the investigation team."

M/s Finolex Industries Limited is the owner & operator of the aircraft. The aircraft is registered in private category. The company was also maintaining a log book which had records of utilizing the aircraft on barter system with other operators, on the basis of time for which the aircraft was flown for/by various companies.

1.17.1REQUIREMENTS AND CONDUCT OF FLIGHT

The Instructor/Examiner on query informed that Capt. 'A' was advised to fly 25 hours under supervision of a senior captain who was experienced on type before undertaking PIC duties. Whereas Capt. 'A' has denied that above advice was given to him. He has also stated that he was confident and competent enough to fly as PIC after the endorsement of his licence.

However, Capt. 'A' requested his company to have some more practice on King Air C-90 with some experienced pilot/instructor.

Capt. 'B' of Bellary Iron Ore was approached for the purpose. The Manager (operations) has stated that it was brought to the knowledge of his seniors. Capt. 'B' was more than 67 years old and was flying with Bellary Iron Ore, which is also a private operator. He was having more than 4000 hrs of experience on King Air C-90. As per the correspondence between company and Bellary Iron Ore it was requested by Finolex Industries that Capt. 'A' "needs some more practice alongwith a senior and experienced pilot like Capt. 'B' for landing at short runway (Ratnagiri) and day and night landing at Pune and Mumbai. In the mail, it was also proposed that whatever charges as instructor fees are required will be paid.

As per the Operations Manual Chapter 1 General, Section 16 Standard Operating Procedures (SOP) for each phase of flight, paragraph A (e) the pilot is required to brief the co-pilot. There is no document stating that the briefing has been carried out regarding all aspects of the intended flight. Capt. 'A' has stated that a small briefing was conducted regarding

Circuits and landings. Flight planning for local flights was done by Operations Manager with the Airport Operator, verbally over the phone. The airport authority then gave a slot to undertake the local flight.

1.18 ADDITIONAL INFORMATION

Rule 28 A of the Aircraft Rules 1937, i.e. Maximum age limit for professional pilots – No person, holding a pilot's license issued under these rules and having attained the age of sixty five years, shall act as Pilot-in-Command or Co-pilot of an aircraft engaged in scheduled air services or non-scheduled air transport operations for remuneration or hire.

The AIC issued by DGCA India dealing with the privileges of the open rating endorsement is the AIC 3 of 1985. As per the AIC 3 of 1985,

- no person holding an Open Rating endorsement on the Pilot's Licence shall exercise the privileges of that rating on any aircraft not flown by him,

unless he carries out familiarisation flight(s) with the Flight Instructor or an experienced pilot duly authorised to do so on that type of aircraft,

provided that such pilot has flown that type and has at least three hours Pilot-in-Command experience within a period of six months, immediately preceding the date of the familiarisation flight(s) on an aircraft appropriate to that weight category.

Further an operations circular 2 of 2004 on recency requirement for Pilot(s)-in-Command &Copilot(s) operating aircraft having all-up-weight not exceeding 5,700 kgs has been issued by DGCA. This circular inter-alia states that these requirements shall also be applicable to pilots who exercise their privileges under Open Rating in terms of AIC 3 of 1985. Depending on the period of absence from flying the circular gives requirements of training/ checks pilot has to undergo prior to start of flying.

DGCA has also issued a general advisory circular 1 of 2010 on the subject “issuance of Circulars and revisions thereof etc. – Requirements to be complied with”. This circular describes the procedure for issue and revision of circulars (both advisory and binding). As per this circular, a binding circular may also be issued to prescribe/ lay down a method acceptable to DGCA for complying with the regulatory provisions. If a circular is issued which is binding in nature, a reference shall be made in the relevant CAR/ AIC. Further it requires that the circulars, which are binding in nature, shall be issued after following the approval process of a CAR.

1.19 USEFUL OR EFFECTIVE INVESTIGATION TECHNIQUES

Nil

2. ANALYSIS

2.1 GENERAL

King Air C-90 aircraft VT-KPC was scheduled for practice circuits and landings by night over Pune Airfield. The PF (Capt. 'A') for whom this practice/ familiarization flying was planned, was holder of an ALTP licence. He was also the senior most/ chief pilot in the organisation. The company had requested another pilot (Capt. 'B') who was not on the pay rolls of company to occupy the right hand seat. Therefore, Capt. 'A' was the PIC. He also stated that he was confident and competent to fly as PIC, he had requested for a practice flight by night and was planned as PIC for Ratnagiri flight next morning. There was no remuneration involved nor the aircraft was hired by any company and the commitment was for Finolex. PF had recently joined the company after a break of approx. 18 years. He had earlier flown same type of aircraft with the same company.

The Company had another pilot who was instructor on this type of aircraft. PF had flown for 3:55 hrs. by day with that Instructor pilot before he (instructor pilot) left the company. There was another type approved pilot on board occupying passenger seat during the flight. He and the PF of this flight were supposed to operate a flight to Ratnagiri, the next day. Manager (Operations) of the company filed the flight plan. As per the Flight Plan Capt. 'B' was the PIC for the flight which appears to be incorrectly filed by the Operation Manager.

2.2 AIRCRAFT

2.2.1 MAINTENANCE

The Aircraft was maintained by DGCA approved Maintenance and Repair Organisation (MRO) as per the approved maintenance schedule. The aircraft had valid Certificate of Airworthiness. The flight release was issued by AME and the aircraft was airworthy for the flight. There were no snags reported/ unattended prior to undertaking the flight. There was

adequate fuel on board the aircraft. The maximum all up weight of the aircraft was 4581 Kgs. The minimum crew necessary for the aircraft was "one".

There were no pending inspections or maintenance on the aircraft or the engines as on the day of accident. The pilot had not reported any problem with the aircraft.

2.2.2 IMPACT AND SUBSEQUENT DAMAGE

An impression of the nose & the main wheels on the edge & slope portion of the ramp indicates that the airplane nose wheel made first physical contact with the ground on the edge of the ramp of runway 28. The impact can be described as skid cum impact. This impact component has forced the Nose Landing gear shock strut rearwards and folding the drag legs into the nose wheel well. The nose wheel was skewed a little to the left and the landing gear wheel well doors were forced into the wheel well. The airplane then made contact with the undershoot portion of the runway, where both main landing gears got detached from the airplane, followed by the loss of both inboard flaps which were selected to the 'Down' position as observed by the physical position of the flap lever in the cockpit. The damage to the outboard flap suggests the same balusters (iron angles) damaged the inboard trailing edge corner of the outboard flap. No material or component failures occurred prior to the impact. All material failures & damage to aircraft structures & components were caused by impact.

2.3 FLIGHT OPERATIONS

2.3.1 CREW QUALIFICATIONS

Capt. 'A', 58 years of age, was having valid ATPL. He had flown for approx. 11400 hours mainly on Airbus A-310 and Boeing B-777 aircraft. He had flown King Air C-90 prior to joining Air India. He had valid medical certificate and his IR on King Air C-90 was valid and current. He was

having open rating for flying the aircraft having all up weight less than 5700 kgs.

Pilot occupying right hand seat also had ALTP with privileges restricted to those of PPL and was 67 years of age. His licence had condition as per Rule 28 A of the Aircraft Rules 1937, i.e. Maximum age limit for professional pilots – No person, holding a pilot's licence issued under these rules and having attained the age of sixty five years, shall act as Pilot-in-Command or Co-pilot of an aircraft engaged in scheduled air services or non-scheduled air transport operations for remuneration or hire. After the accident he has given initial statement but was not available for additional statements as he was indisposed due to subsequent road accident.

2.3.2 OPERATIONAL PROCEDURES

The aircraft operations of the company were being looked after by the Chief Pilot through an operations manager, who has retired from Indian Air Force and has not got any specific training of civil requirements or procedures. Neither there is any requirement for private operator. He has been working with the company for last 6 years. There is definitely a requirement of having original licences in person by the pilots when they are operating a flight. The original licences were not produced to the onsite investigation team. The Operations Manager stated that Capt. 'B' has shown him his original licences & other documents on 7th Sept. 2012 i.e. the date of accident. The Operations Manager used to interact with the maintenance organization for aircraft readiness. Company did not have an approved Operations Manual.

2.3.3 WEATHER

When the aircraft got airborne, visibility was 5 kms. and winds were 210/06 knots. There were scattered clouds at 1500 feet with rain. QNH reported was 1008. During the last approach, there were clouds reported at 1500 feet and visibility was 5 kms.in drizzle. The winds were 260/08 knots.

Weather has not contributed to the Accident.

2.3.4 ATC/ Radar Control

There was uninterrupted communication between crew and ATC/Radar. MIRL and PAPI were available as approach aids in addition to Radar. ATC provided necessary assistance throughout the flight. After the first approach, as reported by the crew and as per R/T transcript, Radar provided all the assistance to the aircraft for aligning with the final approach track till the pilot reported contact at 3 NM at 3000 to 3500 feet AMSL.

2.3.5 Human factors

Both the crew members were well rested and medically fit. They were highly experienced on different types of aircraft with more than 10,000 hours each. Therefore prevailing weather also would not have affected their performance. Capt. 'A' had recently joined the company and his previous experience was on B-777 and A-310 aircraft. These aircraft have lot of automation for approach and landing, mainly on long runways with good approach aids. King Air C-90 operates mainly from short airfields like Ratnagiri, which is approx. 3000 feet long without any approach aids. Next day's flight to Ratnagiri could have been on pilot's mind during the accident flight. He was familiar with Ratnagiri having flown to that airfield earlier when he was earlier employed with the same company.

During discussions, Capt. 'A' intimated that when they were at 3000 feet and approximately 3.5 NM from touch-down, Capt. 'B' dropped his hand held mike and while looking for it, with his right hand, he had also very firmly held the control column with his left hand and was controlling the aircraft. He has further stated that Capt. 'B' was at the controls and he thought he would observe an approach, flare and touch-down, since this was their first approach and landing. It is possible that Captain 'B' may have dropped the mike and was bending down to look for it. There is not enough space in the cockpit, therefore his bending down and taking support on the control column would have disturbed PF on the left hand seat in carrying out a proper approach. Since Capt. 'B''s head was down

and he was unable to look out, it would have been impossible for him to fly. Unless, proper handing taking over of controls is done, controls are not automatically taken over by any pilot. In this case it was not possible for Capt. 'B' to take over controls. Being an experienced pilot, realizing the situation, Capt. 'A' (PIC) would have become even more alert to continue the approach on his own without assistance from Capt. 'B' for which he was called by the Company. However, it is possible that aircraft lost additional height because of this but that would have been easily corrected by PF after Capt. 'B' had picked up the mike.

2.3.6 FLIGHT PLAN AND CONDUCT OF FLIGHT

It appears that Capt. 'A', before taking company flying commitments, preferred to fly for some time with an experienced pilot who had more C-90 experience than the First Officer with whom he was going to fly the next day. After initially stating that Capt. 'B' was flying and he was following on controls, Capt. 'A' in his additional statement stated that he was PF occupying the left hand seat. He appeared to have been on controls throughout the flight for his PIC practice with experienced Capt. 'B'.

2.3.7 DGCA REQUIREMENTS – OPEN RATING

As per the AIC 3 of 1985, dealing with the privileges of the open rating endorsement - no person holding an open rating endorsement shall exercise the privileges on any aircraft unless, he carries out familiarization flight(s) with the instructor or an experienced pilot duly authorized to do so, on that type of aircraft. Further, the AIC provides that certain conditions should be met by the pilot, imparting such familiarization. There is no mention of quantum of familiarization(hours) in the AIC. Based on the familiarization flights conducted by and instructor on King Air C-90 for Capt. 'A', his ALTP was submitted in DGCA for renewal including IR rating and DGCA has renewed his IR rating on King Air C-90.

On the strength of this endorsement, Capt. 'A' was authorized to fly King Air C-90 on the strength of his valid ALTP.

There is an operation circular 2 of 2004, which gives recency requirements for pilots who exercise their privileges under open rating in terms of AIC 3 of 1985, which depends on the period of absence from flying. However, DGCA has also issued a general advisory circular 1 of 2010 on the subject "issuance of circulars and revisions thereof etc. – Requirements to be complied with". This circular describes the procedure for issue and revision of circulars (both advisory and binding). As per this circular, a binding circular may also be issued to prescribe/ lay down a method acceptable to DGCA for complying with the regulatory provisions. If a circular is issued which is binding in nature, **a reference shall be made in the relevant CAR/ AIC.** Further it requires that the circulars, which are binding in nature, shall be issued after following the approval process of a CAR.

Keeping in view the above regulatory requirements, it can be safely construed that Capt. 'A' was authorized to fly King Air C-90 aircraft on the strength of his ALTP on which the IR rating on King Air C-90 was endorsed, He was having King Air C-90 endorsed on his license and had flown the aircraft as PIC.

2.4 CIRCUMSTANCES LEADING TO THE ACCIDENT

Capt. 'A' had reached the airport at about 1830 hrs IST and met Capt. 'B' soon after. There was a small discussion regarding experience on King Air C-90 and the layout of Pune airfield. There was also small briefing about the conduct of flight which included circuits and landing. Capt. 'A' needed additional practice as PIC as well as night flying experience along with an experienced pilot before undertaking regular flights. Company had engaged Capt. 'B' as he was available. In the absence of any other experienced pilot, he was requested to fly with Capt. 'A', who was also the Chief Pilot.

He accepted to fly with Capt. 'B' in the absence of any other options. Filing of Flight Plan was not taken seriously and because of Capt. 'B''s age and experience, his name appears to have been filed as PIC. If two pilots are flying together, One being ATPL and the other being PPL, then it is reasonable to expect the ATPL to be

PIC and sit on the Left hand side seat. Capt. 'A' did the take-off from the left seat.

For the circuits and landings, ATC had allotted 3500 feet for circuit, which is approx. 1500 feet AGL, so the aircraft during flight was "in and out" of clouds. Further it was right hand circuit, (away from the side where PIC was sitting) therefore, it was difficult for the PIC to keep the runway in sight. Therefore, first approach was unsuccessful.

Considering the weather existing at that time and other factors included in the preflight briefing, the crew should have coordinated with ATC for left hand circuit subject to traffic. Further, as this was the first night flight on type for the PF after approx. 18 years, the left hand circuit would have been easier.

At 2.6 º glideslope and at 3.5 NM, the aircraft was supposed to be at 965 feet AGL (2907 feet AMSL) so that it could see 2 red and 2 white on PAPI. Therefore, when the pilots established visual contact with the runway, they would have been high on the approach unless they were given descent by Radar which was not so.

As per the crew statements, visual approach commenced from 3.5 NM at or above the glideslope. Power selection at this stage seemed adequate. However as the approach progressed, aircraft had progressively gone below the glide slope, probably due to incorrect selection of aiming point. The aircraft impacted the ground at 880 feet before the threshold. At this stage both main wheels have bent inwards as is indicative from the damages sustained. The impact was very heavy. None of the crew members have reported any stall or its approach symptoms. The loss of altitude and impact of aircraft, short of threshold can also be attributed to abrupt movement of power lever to idle power. There seems to be a misjudgment on the part of pilots that aircraft would have floated for about 250 to 300 meters and touched down at the beginning of the runway.

There was no stall warning. No attempt was made by the crew to carry out missed approach. Runway was 8355 feet long. At V_{Ref}. of 100 kts., aircraft

can stop within 2000 feet of threshold. Therefore, there was no reason for a serviceable aircraft to undershoot. Aircraft was on or above glide slope at 3.5 NM on approach. Therefore, only reason for going below glide slope from a correct or high approach could be selection of aiming point short of the runway in attempt to touch down on the runway as early as possible or / and powering back excessively and early. In either case it was not a suitable landing technique for Pune airfield. Confusion between PF and PNF may also have contributed to the outcome.

3. CONCLUSIONS

3.1 FINDINGS

1. The owner and operator of the aircraft is a non-aviation company and the aircraft was being operated in “normal” category with “private” sub division.
2. The existing King Air C-90 pilot with the operator had left and a retired pilot from Air India (Capt. ‘A’) was hired by company in his place. He had earlier flown King Air C-90 with the operator prior to joining Air India.
3. The aircraft was cleared for single pilot operations.
4. Capt. ‘A’ had undergone familiarization training on King Air C-90 (as per AIC 3 of 1985) on the strength of open rating. His IR was validated by DGCA on King Air C-90A.
5. For last 18 years, Capt. ‘A’ had flown only Airbus and Boeing aircraft which have got lot of automation. He wanted to gain current experience on King Air C-90 with an instructor/ experienced pilot on RHS seat.
6. The company therefore decided to have an experienced pilot on right seat for few local sorties. Capt. ‘B’, a pilot with another private operator and having good experience on King Air C-90 was requested for these sorties. There was no mutual agreement between the two companies on cross utilization of pilots.
7. Flight Plan signed by Capt. ‘A’ was filed for local Circuits and landings by the Operations Manager in the forenoon and as per the filed Flight Plan, Capt. ‘B’ was the Pilot-in-Command.

8. Capt. ‘B’ had reached Pune from Bangalore at around 1800 hrs. Capt. ‘A’ also reached the airport around the same time for operating the flight.
9. Capt. ‘B’ and Capt. ‘A’ had not met each other earlier. Capt. ‘A’ was informed that Capt. ‘B’ has got more than 4000 hrs. of experience on King Air C-90 aircraft.
10. Weather, aircraft serviceability or airfield and approach aids have not contributed to the accident.
11. During the accident flight, PF was Capt. ‘A’, who was having valid ALTP licence and was occupying LHS seat in the cockpit.
12. Right hand seat was occupied by PPL holder (ALTP restricted to PPL due age more than 65 years) who had around 4000 hrs. of experience on C-90 aircraft.
13. Prior to flight there was confusion among the crew as to their respective functions during the flight. Capt. ‘A’ occupied the LHS seat as RHS seat was occupied by Capt. ‘B’.
14. Two way communication with the ATC was maintained throughout the flight. As per the flight plan filed with the Air Traffic Control Pune, the aircraft was to carry out circuit and landings in the local flying area of Pune.
15. Capt. ‘A’ was PF and on controls. The aircraft conveyed its intention to land and backtrack for another departure.
16. As the pilots while turning from base leg towards finals on R/W 28 had lost contact with the runway, therefore, they requested for radar Vectors. The aircraft was therefore handed over to Pune RADAR (118.8 MHz) for providing vectors.
17. Radar vectored the aircraft for visual (2^{nd}) approach.
18. At 3000-3500 feet aircraft was stabilized on approach with landing gears down and locked. Approach flaps had been selected on base leg. Runway was visual at 3 miles from the touchdown. PIC has reported seeing two reds and 2 whites during the approach.
19. PIC reported that PNF dropped his hand mike during the approach. His attempts to pick up the mike disturbed the PF due to pressures on the controls by PNF for a short time.

20. Capt. ‘A’ was supposed to fly to Ratnagiri which had a short runway. Though sufficient length of runway was available at Pune, the length of the runway at Ratnagiri was in the back of mind of the crew.
21. Pilots tried to land the aircraft within the shortest possible distance. They selected the aiming point 250 to 300 m short of the runway. Power management was also incorrect. Aircraft impacted in the undershoot approx. 880 feet (270 meters) short of the runway.
22. Aircraft was fully serviceable. Weather was within minima. There was enough fuel in the aircraft and there were no symptoms of stall.
23. The aircraft was substantially damaged. There was no fire or injury to anybody.

3.2 PROBABLE CAUSES

The aircraft impacted in the undershoot area of the runway due to selection of wrong aiming point and incorrect power management during approach. This happened because crew tried to land the aircraft within shortest possible distance.

Inadequate recent experience of Capt. ‘A’ on type and confusion between pilots contributed to this error in skill and judgment.

4. SAFETY RECOMMENDATIONS

1. DGCA may formulate procedure to supervise operations and training of single aircraft private operators, which have invariably one set of pilots and negligible operational setup.
2. Contents of operations circular 02 of 2004 need to be linked with AIC 3 of 1985 and a fresh regulation may be issued by DGCA covering the whole gamut of training/ recency requirement particularly for pilots flying under Open Category privileges.

Accordingly the checklist and forms to be filled by the examiner for IR and other endorsement applications be amended if needed.

3. DGCA may review minimum flying experience requirements on type prior to operating from short runway, viz less than 5000 feet.
4. DGCA may issue guidelines for operation by single aircraft private operators during changeover of senior pilots as these operators do not have flying supervisors.
5. DGCA may lay down the minimum requirement of an additional person with some flying experience (including retired or grounded pilots) for the management of flying by private operators so that single aircraft operators are able to manage flying within laid down rules and regulations.

Sd-
(R.S. Passi)
Chairman, Committee of Inquiry

Sd-
(Capt. Anil Chaudhari)
Member, Committee of Inquiry

Sd-
(Alves Fernandes)
Member, Committee of Inquiry

NEW DELHI
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