FINAL INVESTIGATION REPORT ON SERIOUS INCIDENT TO M/S THRIVENI EARTHMOVERS PRIVATE LIMITED KING AIR C-90A AIRCRAFT VT-REL AT BARBIL AIRPORT, ORISSA ON 14.04.2011.			
	Aircraft		
		Type	King Air C-90A
		Nationality	Indian
		Registration	VT-REL
2	Owner		M/s Thriveni Earth Movers Private Ltd. Joda, Keonjhar, Orissa-758038.
3	Operator		M/s Thriveni Earth Movers Private Ltd. Joda, Keonjhar, Orissa-758038.
4	Pilot – in –Command		
		Extent of injuries	Minor/None.
5	Co Pilot		
		Extent of injuries	Minor/None.
6	No. of Passengers on board		01
	Extent of Injuries		Minor.
7	Last point of Departure		Ranchi Airport.
8	Intended landing place		Barbil Airport.
9	Place of Incident		Barbil Airport, N 22°02’29.74”. E 85°22’23.26”.
10	Date & Time of Incident		14.04.2011; 1545 Hrs IST.

SYNOPSIS

King Air C-90A aircraft VT-REL owned and operated by M/s Thriveni Earth Movers Private Ltd was involved in serious incident during landing at Barbil on 14.04.2011 at approx 1545 hrs IST.

The aircraft was planned to operate a private flight Bhubaneswar-Barbil, Barbil-Raurkela, Raurkela-Ranchi and Ranchi-Barbil on the day. The

operation in first three sectors was uneventful. The aircraft took off normally from Ranchi at approx 1516 hrs IST with one passenger and two crewmembers on board. Pilot contacted ATC Barbil uneventfully while at 35 miles and maintaining flight level 9000 feet. ATC advised to report at 9 miles and subsequently on finals. While the pilot reported on final, the ATC cleared them to land. The aircraft touched down late and at high speed after crossing the middle marker. Since the speed of the aircraft was high it could not be stopped within the left over length of runway. The aircraft went in a dry channel/drainage of approx five feet wide and approx 4 feet deep at the end of the runway. The aircraft had enough speed/momentum even after traveling into the drain to attempt to cross the drain. In the process nose undercarriage broke and the aircraft could not move further ahead came to a full stop.

Consequential damage sustained to both the engines and nose radome. The leading edge of left wing tip hit the boundary fence and sustained damage.

The incident occurred in bright sunny day. Subsequently the operator notified the occurrence to the DGCA. The occurrence was classified as serious incident and an investigation ordered under Rule 77C of Aircraft Rules 1937 by appointing Inquiry Officer.

All the three persons on board the aircraft escaped unhurt. There was no sign of pre/post impact fire.

The incident occurred due "Improper attitude of the aircraft while approaching to land resulting in overshooting the runway and consequent damage to the aircraft and its accessories".

1. FACTUAL INFORMATION.

1.1 History of flight

M/s Thriveni Earth Movers Private Ltd. King Air C-90A aircraft VT-REL bearing C of A under "Private" category started its day operation on 14.04.2011 at 1000 Hrs operating flight Bhubaneswar-Barbil. The aircraft is approved for single crew operation; however there was an appropriately licensed copilot also on board the flight. The aircraft was duly declared airworthy after carrying out Daily Inspection (DI) by appropriately approved person in accordance with approved DI card before undertaking the first flight of the day i.e Bhubaneswar-Barbil. Subsequently it operated flight Barbil-Raurkela and Raurkela-Ranchi uneventfully. The transit inspection at

other stations was carried out by the co-pilot having valid approvals to carry out transit inspections.

The incident flight was operating Ranchi – Barbil after having proper ADC and FIC obtained: ADC no. issued was J747 and FIC no. was 754. The pilot filed the flight plan at ATC Ranchi before undertaking the flight. The flight plan revealed that the flight was planned to be conducted under IFR initially and under VFR subsequent to going out of control zone of Ranchi ATC. There were two crewmembers and one passenger on board the aircraft. The aircraft took off successfully from Ranchi at 1516 hrs IST and subsequently changed over to route frequency at 27 miles outbound Ranchi at 1527 hrs IST. The pilot contacted ATC Barbil while at 35 miles and maintaining flight level 9000 feet. The ATC advised to report at 9 miles and subsequently on finals. While the pilot reported on final, the ATC cleared them to land. The statement of ATC observer, Eye witness and the ATC log register revealed that the aircraft was approaching with a very high speed. The aircraft landed with a very high speed and crossed the middle marker by approx 300feet before it touched down. The pilot also stated that it was a committed landing. Barbil airstrip being a small airstrip the left over length of runway was approx 1400 feet.

Since the aircraft touched down with a high speed, the pilot could not manage to stop the aircraft in the left over length of runway. The aircraft went in a dry channel/drainage of approx five feet wide and approx four feet deep at the end of the runway. The aircraft had enough speed/momentum even after traveling into the drain to attempt to cross the drain. In the process nose undercarriage broke and the aircraft could not move further ahead. Thus the aircraft came to a full stop at approx 1545 hrs IST. Consequential damages sustained to both the engines and nose radome. The leading edge of left wing tip hit the boundary fence first and then the hard soil and sustained damage. The pilot carried out engine shut down procedures switched off all electrical switches including booster pump, fuel pump, cross feed etc.

Airport fire services immediately reached the site and helped the pilots and the passenger in coming out of the aircraft. All the three persons on board the aircraft escaped unhurt.

There was no sign of pre/post impact fire.

1.2 Injuries to persons.

INJURIES	CREW	PASSENGERS	OTHERS
Fatal	Nil	Nil	Nil
Serious	Nil	Nil	Nil
Minor/None	02	01	

1.3 Damage to aircraft:

The aircraft sustained following damage subsequent to the incident:

1. Propellers of both the engines including left engine spinner got damaged.
2. Left wing tip damaged from leading edge including aft spar, lower and upper skin, navigation and strobe light assembly.
3. Left engine and engine mount including engine intake damaged.
4. Nose landing gear damaged including gear door, drag brace and Nose landing gear extension rod.
5. Weather radar antenna with mounting and radome got damaged.
6. Both Pitot probe damaged.
7. Landing light and taxi light got damaged.

1.4 Other damage:

The left wing of the aircraft hit the boundary fence causing damage to the fence.

1.5 Personnel information

1.5.1 Pilot-in-Command:

Age	39 yrs, approx
Licence	CPL
Date of Issue	23.12.2002
Valid up to	22.12.2012
Category	Aeroplane
Endorsements as PIC	Cessna 152A, King Air C90A
Date of last Med. Exam	06.12.2010

Med. Exam valid up to	05.12.2011
FRTO Licence No	8462
Date of issue	03.12.2001
Valid up to	02.12.2011
IR test done	08.02.2011
IR test due	07.02.2012
Total flying experience	1038:40 Hrs
Experience on type	760:00 Hrs
Total flying experience during last 90 days	78:00 Hrs
Total flying experience during last 30 days	35:00 Hrs
Total flying experience during last 07 Days	13:05 Hrs
Total flying experience during last 24 Hours	03:00 Hrs

Further scrutiny of the personal log book/aircraft records revealed that the pilot in command has not exceeded the flight duty time/flight time limitations laid down in the prevailing regulations.

1.5.2 **Co pilot:**

Age	Approx 51 yrs
Licence	CPL
Date of Issue	05.05.2008
Valid up to	04.05.2013
Category	Multi Engine
Endorsements as PIC	Cessna 172, BN2 Islander, B200 and King Air C90.
Date of last Med. Exam	16.03.2011
Med. Exam valid up to	15.09.2011
FRTO Licence No	11388

Date of issue	05.05.2008
Valid up to	04.05.2013
IR test done	15.03.2011
IR test due	14.03.2012
Total flying experience	791: Hrs
Experience on type	210:23 Hrs
Total flying experience during last 90 days	67:50 Hrs
Total flying experience during last 30 days	22:40 Hrs
Total flying experience during last 07 Days	10:40 Hrs
Total flying experience during last 24 Hours	05:15 Hrs

Further scrutiny of the personal log book/aircraft records revealed that the co pilot has not exceeded the flight duty time/flight time limitations laid down in the prevailing regulations.

1.6 **Aircraft information:**

1.6.1 The King Air C-90A is an all-metal, low-wing, twin-engine turbo-propeller airplane with retractable landing gear. The airplane is equipped with conventional ailerons, elevators and rudder, for roll, pitches and yaw control. The airplane is equipped with dual controls for the pilot and co-pilot.

The King Air C 90A aircraft VT-REL has been manufactured by Raytheon Aircraft Company, Post Box 85, Wichita, Kansas, USA in the year 2000. The aircraft bearing serial number MSN L.J 1604 has been duly entered in the register of India with effect from 10.01.2007 and allotted with registration VT-REL endorsed in the certificate of registration No. 3484/2. The owner and the operator of the aircraft is M/s Thriveni Earth Movers Pvt Ltd, Joda Womens College, Banaikela, Keonjhar, Orrissa-758038.

The aircraft VT-REL has been issued with the Certificate of Airworthiness (C of A), bearing serial no. 2893 issued on 10.01.2007. The C of A, initially, was issued on the strength of Export C of A No. E351233 dated 15.11.2006 and valid up to 31.07.2010. On 23.07.2010 the C of A has been further revalidated up to 31.07.2012. Its C of A

has the restriction of the operation of the aircraft within PRIVATE category only. The minimum crew necessary allowed is ONE with maximum authorized all up weight 4581 Kg.

1.6.2. The scrutiny of the DGCA approved weight schedule revealed that the aircraft was last weighed on 13.11.2006 by Hawker Pacific Asia Pvt Ltd at Singapore. Weighing of the aircraft was not due as per DGCA regulation before the incident flight. The weight schedule revealed that maximum authorized takeoff weight including empty weight of the aircraft, usable fuel, commercial pay load etc should not exceed 4581:00 Kg (10100.00 lbs).

The pilot in command had filled in load and trim (L&T) Performa before commencement of incident flight. The filled in Performa in association with the passengers manifest revealed that total takeoff weight including Basic Empty Weight of the aircraft, Weight of both the crew and one onboard passenger, on board cargo of 50 lbs and total fuel on board 2100 lbs was 9476.08 lbs. Which was within the limit of maximum authorized takeoff and landing weight (Maximum authorized landing weight is 9600 lbs/4354 Kg). The C.G for the incident flight was also calculated and found to be 153.137 inch, which is within the permissible limit, is between 152.0 to 160 aft of the datum.

1.6.3 Scrutiny of the Airframe logbook of the aircraft revealed that on the day of incident the aircraft had done 3011:59 airframe hrs since new and 436:23 hrs since the renewal of last C of A. The last C of A schedule inspection of the aircraft was done on 02.07.2010 at 2595:36 hrs. However it was endorsed on 23.07.2010 and revalidated up to 31.07.2012. Last modification issued bearing No. DGCA/NEW/MISC /129 was carried out on 11.03.2011. Last highest inspection schedule i.e Phase IV/800hrs/2yrs inspection schedule was carried out on 02.07.2010 at 2595:36 airframe hrs. Last phase I/200 hrs/6 month inspection schedule was carried out on 30.11.2010 at 2792:50 airframe hrs. Last phase II/400 hrs/12 month inspection schedule was carried out on 30.03.2011. Annual Review of Airworthiness is found to be due on 01.07.2011. All the Mods/SBs were observed to be complied with. No snag was observed to be pending before the incident flight. There was no snag recorded which could be significant to the incident.

1.6.4 Scrutiny of engine logbooks revealed that the aircraft is powered by two Pratt & Whitney engines of model PT6A-21. The engine bearing Sl. No. PE0329 was recorded to be installed on Left Hand wing and the engine bearing Sl. No. PE0330 on the Right Hand wing. Both the engines have been fitted new on this aircraft and completed 3011:59 engine hrs. Last service bulletin bearing No. P&W SB1537 R3 has been observed complied. All the Mods/SBs were observed to be complied with. No snag was observed to be pending before the incident flight. There was no snag recorded which could be significant to the incident.

1.6.5 Scrutiny of engine propeller logbook revealed that the aircraft is fitted with two Hartzell Propellers bearing Sl No 646 on the LH side and 647 on RH side. Last modification HC-SB-61-311 Rev 2 on the propellers was done on 25.01.2011. All the Mods/SBs were observed to be complied with. No snag was observed to be pending before the incident flight. There was no snag recorded which could be significant to the incident.

Last phase II/400 hrs/12 month inspection schedule was carried out on both the engines and propellers on 30.03.2011 along with the Airframe inspection.

1.6.6 Scrutiny of Radio logbook revealed that Last Mode S inspection was done on 29.09.2009 and last ELT test was done on 19.02.2011. There was no snag recorded which could be significant to the incident. Further scrutiny of the logbook revealed that the CVR Model A100S Part No. S100-0080-00 Sl. No 02829 fitted in the aircraft was removed and installed on 10.03.2011 after satisfactory check of quality recording and integrity check.

1.6.7 Scrutiny of the aircraft records further revealed that all the modifications on the aircraft were found to be complied with before undertaking the incident flight.

1.7 **Meteorological information:**

Meteorological information of the originating airport i.e Ranchi was available but is not significant for the purpose of investigation of the incident.

There is no provision of observing the local meteorological information and disseminating to the inbound traffic at Barbil, however the pilot took the prevailing weather condition on telephone from Barbil tower. The prevailing weather as reported by the pilot to be fine.

1.8 **Aids to navigation:**

Aircraft is equipped with modern navigation aids viz. VOR, DME.

There is no visual and radio navigational aid available at Barbil airport and only VFR operations in day operations are permitted. The aircraft was adequately equipped to navigate under VFR in VMC during day. There is one wind sock installed to understand the prevailing wind direction.

1.9 **Communications:**

The aircraft is equipped with main and standby VHF sets for communication.

Barbil Airport is equipped with STD telephone and a VHF set. There is no recording/replaying facilities available for the communication undertaken.

1.10 **Aerodrome information:**

1.10.1 Airport manual containing information regarding the facilities at Barbil airport was not available and it was informed that no such document has been prepared.

However under mentioned information has been gathered from obstacle survey report published in Nov 2010.

Barbil airport is located at a place called Tanto under the jurisdiction of Barbil town Keonjhar district of Orissa. The owner of the airport is Government of Orissa. Vide a court agreement dated 27.10.2007; it has been handed over to Jindal Steel and Power Limited for maintenance and use within the provisions mentioned therein.

The airport has a north – south runway located between a hill in the south and a highway in the north with runway orientation as 18/36. Due to location of the runway and obstacles around it, runway 18 is

used for landing and runway 36 is used for takeoff. A few relevant parameters are:

Runway designation	18/36
Physical Length & Width	1063M X 15M
Usable Length & Width	992M X 15M
Aerodrome Elevation	505.3M AMSL
Runway End Safety Area	Nil
Stopway, Clearway	Nil

It has been reported that Fire Vehicle and the Ambulance is arranged and made available while the airport is operational category of requirement was not laid down in any form of the documents.

1.10.2 Landing distance required for the aircraft VT-REL, with engine propeller reversing, at Barbil airstrip with the landing weight 9275lb (as per L & T Sheet)), OAT 30°C would be between 1000feet – 1250 feet depending on wind 0 – 10kts.

1.11 **Flight recorders:**

The CVR is not mandatory equipment, as per prevailing norms to be installed on this category of aircraft. However a CVR of make Fairchild Model A100S Part No. S100-0080-00 Sl No 02829 was installed on this aircraft.

Scrutiny of the logbook revealed that the CVR was last removed and installed on 10.03.2011 after satisfactory check of quality recording and integrity check.

While on site inspection after the incident the CVR was removed and sent to R & D Lab of DGCA Hqrs at New Delhi for download and decoding/preparation of transcript of the stored information. The CVR transcript revealed that the information stored in it belonged the first flight of the day operated between Bhubaneswar-Barbil. It was further observed that CVR had stopped functioning after approx five minutes of takeoff from Bhubaneswar. Recording of the incident flight was not stored in CVR.

The facility to test the serviceability/functioning of the CVR is provided on the aircraft enabling the pilot to test its serviceability

before the flight. However the same is not included in either the cockpit checklist of the pilot or in the transit/DI checklist by the manufacturer/DGCA.

1.12 **Wreckage and impact information:**

1.12.1 Incident site inspection revealed that the nose undercarriage of the aircraft had gone in a dry channel/drainage at the end of the runway and stopped. It further appeared that aircraft had sufficient speed/momentum and it tried to come out of the drain causing further damage to various parts of the aircraft; however no parts was disintegrated from the aircraft.

1.12.2 The tyre markings on the runway revealed that out of a total length of runway i.e 3500 feet approx, the aircraft floated for approx 2100 feet before touchdown. After initial touchdown approximate runway length available was 1400 feet. Strong impression of tyre dragging was seen approx for last 400 feet of the runway indicating that a heavy braking was applied on wheel by the pilots.

1.12.3 The LH and RH engine and propeller control systems were checked in accordance with Approved Maintenance Manual and observed that:

a) Engine and propeller were operating satisfactorily, freely and in correct sense.

b) There was no breakage or restriction in the in the Beta Control cable and observed operating satisfactorily.

c) Pedestal friction adjusters were found to be operating satisfactorily and the levers maintained the selected position even at the minimum friction settings.

1.12.4 The wheel and braking systems were checked in accordance with approved maintenance manual and observed that the operation of RH and LH wheel brake was satisfactory and there was no sign of sponginess.

1.13 **Medical and pathological Information:**

Both the pilots and the only passenger onboard came out of the aircraft after the incident without any injury. They were not subjected to any post incident medical examination.

1.14 **Fire:**

There was no evidence of pre/post incident fire.

1.15 **Survival aspects:**

The incident was survival and all the occupant escaped the incident unhurt.

1.16 **Tests and research:**

N/A.

1.17 **Organizational and management information:**

Thriveni Earth Movers Private Ltd owns only one King Air C90A aircraft VT-REL keeping its main base at Bhubaneswar. The aircraft has valid C of A under PRIVATE category and utilized to transport its company personal. The aircraft is under maintenance agreement with M/s Deccan Charters Ltd, Bangalore. Deccan Charters Ltd has its base at Bhubaneswar also to meet day to day needs of the operator.

1.18 **Additional information:**

The statement of the pilot was recorded in order understand the circumstances which led to the incident. The relevant portion is as:

Quote: "I reported finals and was given clearance to land for R/W18. The landing was absolutely smooth, touched down at a speed of 85-90Kts and the reverse was very effective, speed came down to less than 30 Kts. Aircraft almost came to a complete stop and the runway margin left over was about 1000-1200feet. Anticipated, it will 100% stop as normal with little bit of braking and as I came out of reverse for a second to ground fine and back to reverse with constant braking. But instead of stopping the aircraft behaved abnormally, suddenly the speed again picked up as if going for takeoff, with the power levers held to constant reverse and braking with a forward push on the control column and non release of the brakes and reverse the aircraft has dragged with minimum speed with little or no friction between the tyre and the runway surface up to 1200 ft". Unquote

1.19 **Useful or effective investigation techniques**:

Nil.

2. ANALYSIS

2.1 Serviceability/Maintainability of the aircraft:

2.1.1 King Air C 90A aircraft VT-REL has been entered in the register of India with effect from 10.01.2007 and allotted with registration VT-REL endorsed in the certificate of registration No. 3484/2. The owner and the operator of the aircraft is M/s Thriveni Earth Movers Pvt Ltd, Joda Womens College, Banaikela, Keonjhar, Orrissa-758038. It has been issued with the Certificate of Airworthiness serial no. 2893 issued on 10.01.2007. The C of A of the aircraft was valid before the incident flight. Its C of A has the restriction of the operation of the aircraft within PRIVATE category only. The minimum crew necessary, allowed is ONE with maximum authorized all up weight 4581 Kg.

The aircraft was observed to be operated within the proviso of valid C of A and C of R.

2.1.2 DGCA approved weight schedule revealed that the aircraft was last weighed on 13.11.2006 by Hawker Pacific Asia Pvt Ltd at Singapore. Weighing of the aircraft was not due as per DGCA regulation before the incident flight. The pilot in command had filled in load and trim (L&T) Performa before commencement of incident flight. The filled in performa in association with the passengers manifest has been analyzed and it has been brought out that total takeoff weight including Basic Empty Weight of the aircraft, Weight of both the crew and one onboard passenger, on board cargo of 50 lbs and total fuel on board 2100 lbs was 9476.08 lbs. Which was within the limit of maximum authorized takeoff and landing weight (Maximum authorized landing weight is 9600 lbs (4354 Kg)). The C.G for the incident flight was also calculated and found to be 153.137 inch, which is within the permissible limit i.e between 152.0 to 160 inch aft of the datum.

Loading of the aircraft and the movement of Centre of Gravity doesn't appear to be contributory factor of the incident.

2.1.3 Airframe logbook, both engine logbooks, propeller logbooks and the radio logbook of the aircraft has been scrutinized and the records therein analyzed. The analysis of these documents revealed that no

schedule inspections were due to be carried out before undertaking the incident flight. Last highest inspection schedule i.e Phase IV/800hrs/2yrs inspection schedule was carried out on 02.07.2010 at 2595:36 airframe hrs. Last Phase I/200 hrs/6 month inspection schedule was carried out on 30.11.2010 at 2792:50 airframe hrs. Last phase II/400 hrs/12 month inspection schedule was carried out on 30.03.2011. Annual Review of Airworthiness is found to be due on 01.07.2011. All the Mods/SBs were observed to be complied with. No snag was observed to be pending before the incident flight.

2.1.4 The aircraft was fitted with CVR of make Fairchild Model A100S Part No. S100-0080-00 Sl. No. 02829 which was removed and satisfactorily installed after satisfactory check of quality recording and integrity check.

After the incident, the CVR was removed and sent to R & D lab, DGCA Hqrs for downloading and decoding/preparation of transcript. The transcript was analyzed and observed that the information stored in it belonged to earlier flight operated between Bhubaneswar-Barbil. It was further observed that CVR had stopped functioning after approx five minutes of takeoff from Bhubaneswar. Recording of the incident flight was not stored in the CVR.

There is a built in facility given by the manufacturer in the cockpit to test the functionality of the CVR before takeoff. Pilot didn't do so because the same was not mentioned in their cockpit checklist by the manufacturer/DGCA. Probably because CVR is a recommended equipment and not mandatory for this category of aircraft.

It implies that CVR unit or its system has stopped functioning while operating first flight of the day and went unnoticed by the crew because it was not mandatory for them to test its function.

Even though functioning of the CVR doesn't seem to be contributory factor to the incident it could have helped in establishing the cause of the incident. The CVR unit and the system should be checked for any maintenance error in the unit or in the operating system before declaring the aircraft airworthy for the next flight.

2.1.5 The Daily Inspection (DI) of the aircraft was observed to be carried out by appropriately approved person before the beginning the day

operation at Bhubaneswar. Subsequent transit inspection at other stations was carried out by the pilot having valid approvals to carry out transit inspections. The analysis of the records of aircraft journey logbook revealed that there was no snag recorded which could be significant to the incident.

The discussions made in above Para 2.1 infers that serviceability/ maintainability of the aircraft was not the contributory factor to the incident. However the CVR and its system shall have to be subjected to a thorough maintenance analysis for its correct functioning.

2.2 Airport Facilities:

Barbil airport owned by Government of Orissa was laying unutilized and unfit for landing and takeoff of the aircraft. However in the interest of growing industrialization in the surrounding areas, Government of Orissa Vide a court agreement dated 27.10.2007 handed over to Jindal Steel and Power Limited (JSPL) for maintenance and use within the provisions mentioned therein.

The JSPL management probably maintained the airport worthy enough for safe takeoff and landing of the aircraft. Now a day it is under regular use by many operators other than JSPL themselves. During site inspection it was observed that the airport doesn't have any manual containing information regarding the facilities and the operating capabilities of Barbil airport. The details of the availability of Airport Rescue and Fire Fighting Services were also not seen documented in any form.

Even though the facility at Barbil airport doesn't seem to be contributory factor to the incident; the airport operators should comply with the safety requirements laid down by the DGCA time to time. As the airport is in regular use the operational capabilities and availability of various facilities should be declared to have a safe operation to/from Barbil airport.

2.3 Operational Aspect

2.3.1 The operating crew, the pilot in command and the co-pilot had the endorsement of King Air C90. They had all other requirements/ licenses such as Medical, FRTO/Instrument Ratings etc valid before operating the incident flight. The pilot in command had a total flying

experience of 1038:40 hrs and type experience was 760:00 hrs. The co-pilot had total flying experience of 791:00 hrs and type experience was 210:25 hrs. The pilot in command underwent the pre-flight medical examination and found that he was not under influence of alcohol.

Appropriately authorized person carried out the Daily Inspection (DI) of the aircraft in accordance with approved Preflight Inspection Task Card before the beginning the day operation at Bhubaneswar. Before accepting the aircraft in the morning the pilot in command also made sure that it had valid Certificate of Airworthiness and Flight Release. All the instruments and the equipments as prescribed were installed. The aircraft was loaded within the limit with the centre of gravity (C.G) being within approved range. It had sufficient fuel and oil to complete intended flight. There was no apparent damage observed during pre flight inspection by the pilot. There was no snag pending for rectification on airframe, engines, propeller and aircraft radio equipments. The flight controls were moving freely and in correct sense.

The aircraft operated three sectors i.e Bhubaneswar-Barbil, Barbil-Raurkela and Raurkela-Ranchi uneventfully. It took off from Ranchi normally after having proper ADC and FIC obtained and flight plan filed. The flight was planned in a manner to be conducted under IFR initially and under VFR subsequent to going out of control zone of Ranchi ATC. There were two crewmembers and one passenger on board the aircraft. The aircraft took off normally from Ranchi at 1516 hrs IST and subsequently changed over to route frequency at 27 miles outbound Ranchi at 1527 hrs IST. The pilot contacted ATC Barbil while at 35 miles and maintaining flight level 9000 feet. The ATC advised to report at 9 miles and subsequently on finals. While the pilot reported on final, the ATC cleared them to land as weather was conducive for operation.

The aircraft touched down after crossing the middle marker by approx 300 feet and at high speed. It consumed approx 2100 feet of runway in air before it touched down. There was approx 1400 feet length of runway still left which was enough to make a safe landing with the normal landing speed; maximum landing roll required to stop in the existing scenario should not be more than 1250 feet. Since the pilot landed with a high speed he could not manage to stop the aircraft in

the left over length of runway; resulting in overshooting the runway and finally stopping after going in the dry channel/drainage. High speed is further substantiated by the signature at the site such as long tyre rubbing marks on the runway, broken nose landing gear and damaged left wing tip.

It is understood from the fact of the location of the airport that it was a committed landing even after the pilot would have realized its attitude. Runway 36 being located almost in the foot of the hill making go around almost impossible from short of the approach for runway 18.

2.3.2 The pilot tried to explain that the landing was absolutely smooth, touched down at a speed of 85-90Kts and the reverse was very effective, speed came down to less than 30 Kts aircraft almost came to a complete stop and the runway margin left over was about 1000-1200feet. Anticipated, it will 100% stop as normal with little bit of braking. As he came out of reverse for a second to ground fine he had to go back to reverse with constant braking. But instead of stopping the aircraft behaved abnormally, suddenly the speed again picked up as if going for takeoff. With the power levers held to constant reverse and braking with a forward push on the control column and non release of the brakes and reverse the aircraft has dragged the runway surface up to 1200 ft.

The available evidences were analyzed, to substantiate the pilot's opinion, and observed that there was no abnormality in respect of engine behavior as reported by the pilot. The LH and RH engine and propeller control systems were checked in accordance with Approved Maintenance Manual after the incident and observed that Engine and propeller were operating satisfactorily, freely and in correct sense. There was no breakage or restriction in the in the Beta Control cable and observed operating satisfactorily. Pedestal friction adjusters were found to be operating satisfactorily and the levers maintained the selected position even at the minimum friction settings. The wheel and braking systems were checked in accordance with approved maintenance manual and observed that the operation of RH and LH wheel brake was satisfactory and there was no sign of sponginess. The above analysis reveals that the opinion of the pilot is superfluous.

The deliberations made in the above Para infer that delayed touchdown associated with high landing speed have resulted the aircraft in overshooting the runway and consequent damage to the aircraft and its accessories. Thus pilot's incapability to maintain proper attitude while landing was the contributory factor of the incident.

3. CONCLUSIONS:

3.1 Findings:

3.1.1 The aircraft was operated within the proviso of valid Certificate of Airworthiness and Certificate of Registration before the incident flight.

3.1.2 The aircraft was maintained in airworthy condition and no defect was pending for rectification.

3.1.3 All the modifications & service bulletins were complied and there was no snag reported on the aircraft before the incident flight.

3.1.4 The pilot in command had filled in load and trim (L&T) Performa before commencement of flight. Total takeoff and landing weight was within the limit of maximum authorized takeoff and landing weight.

3.1.5 The C.G for the incident flight was also calculated and found to be within the permissible limit.

3.1.6 Loading of the aircraft and the movement of Centre of Gravity doesn't appear to be contributory factor of the incident.

3.1.7 The recording of the incident flight was not stored in the CVR. The information stored belonged to earlier flight operated between Bhubaneswar - Barbil. It was further observed that CVR had stopped functioning after approx five minutes of takeoff from Bhubaneswar.

3.1.8 There is a facility given by the manufacturer in the cockpit to test the functionality of the CVR before takeoff. The pilot didn't do so, probably because the same was not mentioned in their cockpit checklist; as it is not mandatory equipment.

3.1.9 The CVR unit and its system should be subjected to a thorough maintenance analysis for its correct functioning before the aircraft is cleared for the next flight.

3.1.10 The Daily Inspection (DI) of the aircraft was carried out by appropriately approved/authorized person before the beginning the day operation at Bhubaneswar.

3.1.11 Subsequent transit inspection at other stations was carried out by the pilot having valid approvals to carry out transit inspections.

3.1.12 Serviceability/maintainability of the aircraft was not the contributory factor to the incident.

3.1.13 Barbil airport is owned by Government of Orissa and maintained by Jindal Steel and Power Limited (JSPL). The airport doesn't have any manual containing information regarding the facilities and the operating capabilities. The details of the availability of Airport Rescue and Fire Fighting Services were also not documented in any form.

3.1.14 The facility at Barbil airport doesn't seem to be contributory factor to the incident.

3.1.15 The operating crew, the pilot in command and the co-pilot were appropriately licenced and rated to conduct the flight.

3.1.16 The aircraft operated three sectors i.e Bhubaneswar-Barbil, Barbil-Raurkela and Raurkela-Ranchi uneventfully.

3.1.17 It took off from Ranchi normally after having proper ADC and FIC obtained and flight plan filed.

3.1.18 Weather was conducive for operation and not a contributory factor to the incident.

3.1.19 The pilot landed with a high speed and could not manage to stop the aircraft in the left over length of runway; resulting in overshooting the runway and finally stopping after going in the dry channel/drainage.

3.1.20 The pilot's incapability to maintain proper attitude while landing was the contributory factor of the incident; which led the aircraft in overshooting the runway and consequent damage to the aircraft and its accessories.

3.2 Probable cause of the Serious Incident:

Improper attitude of the aircraft while approaching to land was probable cause of the incident resulting in overshooting the runway and consequent damage to the aircraft and its accessories.

4. SAFETY RECOMMENDATIONS:

4.1 Appropriate action in view of findings 3.1.7, 3.1.8 and 3.1.9 may be taken.

4.2 Action as deemed fit may be taken in view of finding 3.1.13.

4.3 The action as deemed fit in view of finding 3.1.19 and 3.1.20 may be taken.

Place: Kolkata
Date: 30th May 2011

(Sanit Kumar)
Regional Controller Air Safety
Inquiry Officer, VT-REL