CIVIL AVIATION ACCIDENT

REPORT NO 04/375

FEDERAL REPUBLIC OF NIGERIA

MINISTRY OF AVIATION

FINAL REPORT

ON THE ACCIDENT TO THE
EXPRESS AIRWAYS AIRCRAFT
BANDEIRANTE EMB 110
REGISTERED 5N-AXM
ON

FINAL APPROACH TO
KADUNA AIRPORT

ON SATURDAY 17TH MARCH, 2000.

Federal Ministry of Aviation

Accident investigation and prevention Bureau

FEDERAL SECRETARIAT, SHEHU SHAGARI WAY, ABUJA.

Tel:5238568

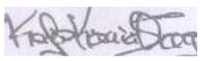
Ref: No. 04/375
5th April, 2001

Honourable Minister of Aviation,
Federal Secretariat,
Shehu Shagari Way,
P.M.B. 5012, Wuse,
Abuja

Civil Aviation Accident Report.

Madam,

I have the honour to present the final report on the accident to the Sky Power Express Airways aircraft, a Bandeirante EMB 110, registered 5N-AXM on the final approach path to Kaduna Airport.



Engr. K. K. O. Sagoe,
Director,
Accident Investigation and Prevention Bureau.

REPORT ON THE ACCIDENT TO THE EXPRESS AIRWAYS AIRCRAFT BANDEIRANTE EMB 110 REGISTERED 5N - AXM ON FINAL APPROACH TO KADUNA AIRPORT ON THE 17T MARCH, 2000

Aircraft Data

Type	-	Bandeirante EMB 110
Registration	-	5N - AXM
Serial Number	-	110 446
Year of Manufacture	-	1984
Manufacturer	-	Embraer Empresa Brasileirade Aeronautical S. A. AV Brig Fatia Lima 2170 Sac Jose Dos Campos, Sao Paulo, Brazil.
Total Airframe Time	-	10,926 hours
C of "A" Validity	-	8th February, 2001
Owner	-	Express Airways Nigeria Limited 96 Awolowo Road, S. W. Ikoyi, Lagos.
Operator	-	Owner

Engines

Type	-	PTGA - 34	
Manufacturer	-	Pratt and Whitney Canada Inc.	
		No 1	No 2
Serial Number	-	PC - E57521	PC - 057187
TSN	-	3509 hours	13,487 hours
TSO	-		1263.6 hours (As at 14'h Jan. 2000)

Propellers

Type	-	Hartzell HC - B3TN - 3C
Serial Number	-	1. 13U. 18662 2. DU. 15407
Place of Accident	-	Final Approach Runway 05. Kaduna Airport
Date and Time:		- 17"' March, 2000 at 0947 hours UTC.

1.0. Factual Information

1.1. History of Flight

On the day of the accident, the aircraft was engaged in a charter operation for the Central Bank of Nigeria. The first segment of the flight (Lagos - Abuja) was flown by the Commander. The aircraft departed Lagos about 0630 hours UTC and initially at cruise, the crew had a momentary problem setting power on the starboard engine after which the flight continued normally to Abuja.

The aircraft which departed Abuja for Jos at 0900 hours UTC had 6 souls on board, 5 hours endurance with the first officer at the controls. At FL 90 and about 30NM from Abuja, the crew again had problems with the cruise power setting on the starboard engine. The torque remained at 1400. The crew retarded the right power lever to the minimum with the aim of achieving a cruise setting of 1300 but the gear warning came on. The Commander at this stage took over the controls from the first officer.

At 0923 hours UTC, the aircraft contacted Kaduna Tower that it would be diverting to Kaduna as against its scheduled destination giving its flight level as 90 at a distance of 61 miles and estimating TMA at 24 miles, 'KC' at 41 miles, 6 souls on board and 5 hours endurance at departure. The tower then gave the aircraft an inbound clearance to 'KC' locator maintaining FL 90 and to expect no delay for a locator approach runway 05.
Weather report at 0900 hours UTC was also passed to the aircraft as wind 090/05 knots, QNH 1014 and temperature 30℃.

At 0928 hours UTC the airplane at about 42 miles, speed between 150-160 kts, requested descent and was cleared to 4,500H, QNH 1014. At about 0935 hours UTC, the pilots contacted tower that they would make a single engine approach because they were having problems controlling power on the starboard engine and it would be shut down. The tower in response, asked whether they would need fire coverage on landing to which the pilots affirmed.

The commander then reviewed the single engine approach with the first officer estimating 4,500 ft at 8NM. Approaching 4,500 ft at 11 NM, the crew initiated right engine shut down after which the speed was decayed from 150 to 140 kts.

At 0946 hours UTC, the pilot reported 6nm final and field in sight while the tower requested hire to report 4 miles final. Shortly, the controller reported having the aircraft in sight and subsequently cleared it to land on runway 05 giving wind as north easterly 06 knots. Descending at 500ft/min, the commander requested for 25% of flap when the first officer selected full flap. Shortly, the speed started decaying and bleeding faster. When the aircraft was at 2,700 ft high, the speed had already decayed to between 100 - 110 kts.
The crew applied full power on the port engine to arrest the speed decay but to no avail . The pilot was trying to correct the descent rate, speed decay and the assymetry when the stall warning came on.

At this juncture, all effort by the controller to establish further contact with the airplane proved abortive. Suddenly, the controller observed a gust of dust in the atmosphere which gave him an indication that the aircraft had crashed. The aircraft crashed into the new VOR/DME site being constructed about 1175m from the threshold of runway 05. Time of accident was 0947 hours UTC.

1.2. Injuries to Persons

Injuries	Crew	Passenger	Others
Fatal	0	0	0
Serious	1	0	0
Minor/None	2/0	0/3	0

1.3. Damage to Aircraft

The aircraft was substantially damaged.

1.4 Other Damage

There was no third party damage.

1.5 Personnel Information

Commander

The Commander of the aircraft is a 55 year old male Nigerian. He had Airline Transport Pilot licence number 2017 which was valid till 29"' March, 2000. He had ratings on conquest C444, C425, C310, DHC-6, EMB 110, Citation II.
As at the time of the accident, he had a total flying time of 8,733 hours of which 1008 hours were on type.

First Officer

The first officer is a 27 year old male Jamaican National. He had commercial pilot licence number 4321. The licence was not valid and was being processed for renewal as at the time of the accident. His ratings were ;

Boeing 727
Cessna 172, 182, 421.

He had a total flying time of 3100 hours out of which 200 hours were on type

1.6. Aircraft Information

The aircraft was manufactured in the year 1984 and had accumulated a total flying time of 10,926 hours as at the time of this accident. The Certificate of Airworthiness was valid till 8"' February, 2001. The aircraft was powered by two Pratt and Whitney turbo-prop engines type PT6A-34. The Port Engine had delivered engine power for 3509 hours since new while the starboard engine had delivered engine power for 13,487 hours since new and 1263.6 hours since overhaul.

Although, there was no known deferred defects registered but flight crew in recent times before the crash had been having problems controlling power on the starboard engine, which was never recorded in the technical log book.

1.7. Meteorological Information

Weather was not a factor in the accident.

1.8. Aids to Navigation

Navigational aids were not contributory in the accident.

1.9 Communications

The communication between the aircraft and Kaduna Tower was good on the day of the accident.

1.10. Aerodrome Information

Kaduna runway is designated as 05/23, 3000 m long and 60m wide. The aerodrome elevation is 2073ft.

1.11 Flight Recorders

The aircraft was neither equipped with Cockpit Voice Recorder nor Flight Data Recorder. Though, such category of aircraft is not mandated by the Civil Aviation Regulations to carry such equipment.

1.12. Wreckage and Impact Information

The aircraft was rested on its belly in an open space of the new VOR/DME site being constructed about 1175m from the threshold of the runway 05 and about 81m off to the right of the extended centreline of runway 05.

The aircraft on impact skidded on its belly (gear up) for about 68m before the final resting position, with its right wing down altitude - evidenced by broken parts (pilot drainer, paint shavings, landing light cover and fuel spillage) .

There was severe flexural damage to the port propeller including the tips (chips off) compared with the right propeller blades.

The aircraft turned almost 180° from its crash path (direction) before its final resting position.

1.13. Medical and Pathological Information

Commander

Examination under anaesthesia showed a full thickness irregular laceration measuring 6cm in length on the gingivolabial fold which exposed the unfractured roots of the upper right premolar and molar teeth. There was another laceration measuring 5cm running lateromedially across the roof of the nose and terminating on the inferior turbinate. Probably implicating the cribri form plate of the ethmoid. Finally, there were Z lacerations on the nasolabial folds bilaterally.

Flight Officer

He had chest pain and bleeding from a punctured wound on the angle of the jaw. Clinical examination and further x-ray examination did not reveal any additional bony injuries.

Cabin Crew

She had neck pain. She did not have any open injuries. Clinical examination revealed grossly normal muscular skeletal system without any neurological deficit. X-rays of the neck did not reveal any fractures of the cervical vertebrae.

1.14. Fire

There was no fire outbreak.

1.15 Survival Aspect

The accident was survivable because there was no fire and that the aircraft crashed into a favourable terrain devoid of trees and obstructions.

1.16 Tests and Research

None.

1.17. **Additional Information**

None.

2. ANALYSIS

2.1 Approach

The fact that the crew had problems controlling power on the starboard engine and had to shut it down was not critical since the aircraft is designed to handle a oneengine inoperative approach without adverse consequences. In essence, if the laid down procedures for making an approach with a single engine approach were strictly adhered to, the crew would have landed the airplane safely.

The airplane became uncontrollable when the commander requested for 25% of flap at an appropriate speed of '150 kts but the first officer who seemed not to be in the picture in this flight ignorantly selected full flaps. Consequently, the crew could no longer control the descent rate, speed decay and the asymmetry and the degraded configuration leading to the onset of the stall warning and the eventual crash.

2.2. Crew Co-ordination

Crew co-ordination was practically not in existence and the first officer could not be adjudged to understand what his commander was doing at any particular time in this flight. Even when the commander had a call out, the approach of the co-pilot was rather casual and inconsistent. It is surprising to note that in the course of investigation the first officer could not confirm whether the landing gear was deployed at any particular phase of the flight.

The first officer did not demonstrate that he had an adequate knowledge of this airplane while the commander also seemed not to have confidence in him because according to the captain, the first officer's reactions and responses to his commands were not rational and logical.

2.3. Training

The fact that the accident was avoidable had it been the crew carried out the one-engine inoperative approach in accordance with the recommended procedures prompted this Bureau to look into the training records of the pilots. During tire course of these investigations, it was discovered that no simulator session was attended by the crew. And that the proficiency check they went through was merely a route check since some critical manoeuvres such as landing with one engine inoperative were waived. . Though, the Nigerian Civil Aviation Regulation does not insist on the use of live simulator for this category of aircraft but for all intents and purposes of safety such training is critical in order for the pilots to acquire the required knowledge and practical experience

3. Conclusions

3.1. Findings

1. The aircraft was properly registered and certified in accordance with the Civil Aviation Regulations of Nigeria.

2. The commander of the aircraft was certified and qualified to take the flight while the first officer did not have a licence on board on the clay of the accident. The licence had expired and yet to he renewed

3. The proficiency check attended by the GWW was Without some critical manoeuvres such as simulated single engine approach and stalls.

4. The aircraft on departure from Abuja was to land at Jos but diverted to Kaduna.

5. The crew informed kaduna Control Tower that they were doing to make a single engine (Port) approach since they were having problems controlling power of the starboard engine.

6. The pilots did not adhere to the laid down procedures for a one-engine inoperative approach.

7. Crew co-ordination was practically lacking in this flight.

8. The Control Tower lost contact with the aircraft at about 4NM to the airfield.

9. The Landing Configuration of the aircraft was full flaps, gear up with power only on the poet engine.

10. The starboard engine propeller was not feathered.

11. The aircraft crashed into the new VOR/DME site being constructed about Urn from the threshold of runway 05.

12. The final resting position of the aircraft was about 68m from the first point of impact and almost turning 180° from its initial direction (flight path).

13. There was power on the port engine as there was severe flexural damage to the **propeller blades (tips chip off).**

3.2. Probable Cause of the Accident

The probable cause of this accident was the poor handling by the crew of the one-engine inoperative approach.

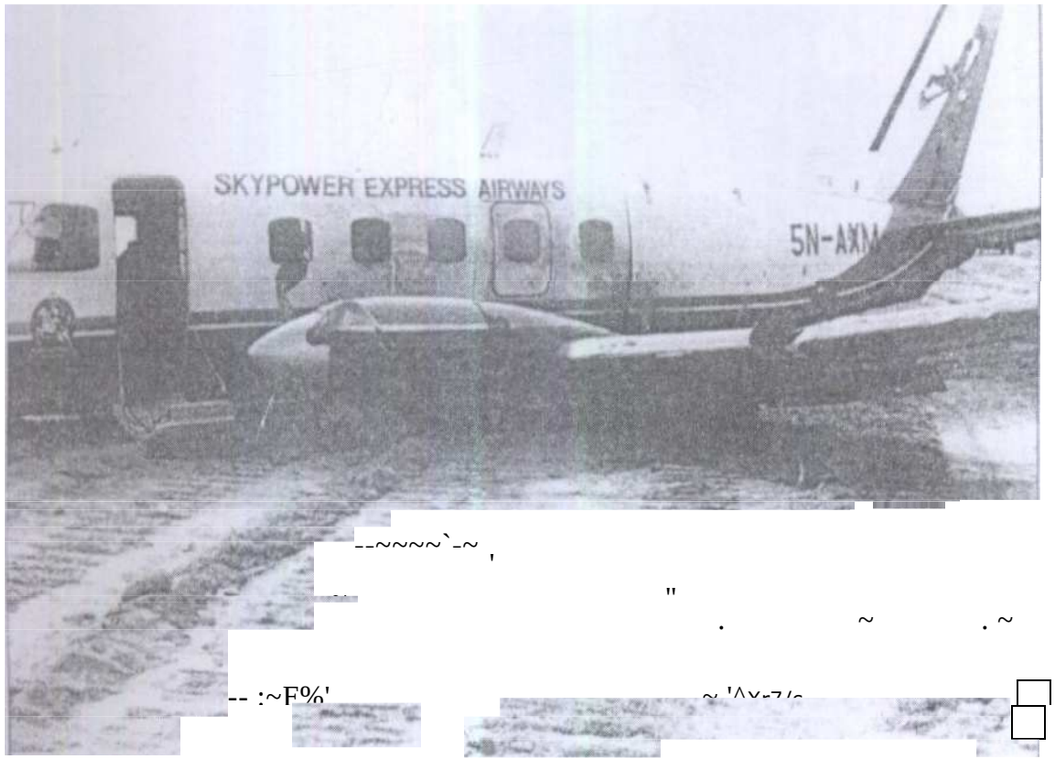
4.0. **Safety Recommendations**

1. The Nigerian Civil Aviation Regulations should be reviewed to mandate pilots of smaller aircraft to attend a simulator session at least once in a year.

2. The NCAA should monitor aircraft operators to ensure that their base and proficiency checks are regularly done as and when due while all the components of the checks are carried out without the benefit of waiver s.

3 Furthermore, the NCAA should ensure that the practice on the part of the pilots to operate without a valid pilots licence or in the alternative, a receipt in lieu of a licence be discouraged.

APPENDIX I



The port side of the aircraft showing the damage to the aircraft and the escape hatch still intact.

Photograph showing serious damage to the starboard wing and engine.