



AIRCRAFT ACCIDENT REPORT

WESTLINK/2014/08/11/F

Accident Investigation Bureau

**Final Report on the Accident involving Westlink
Airlines Limited Piper Aztec23-250 Aircraft with
Registration Number 5N-BGZ which occurred at
Matseri Village, Bunza Local Government Area of Kebbi
State, Nigeria on 11th August 2014**

This report was produced by the Accident Investigation Bureau (AIB), Murtala Muhammed Airport, Ikeja, Lagos.

The report is based upon the investigation carried out by Accident Investigation Bureau, in accordance with Annex 13 to the Convention on International Civil Aviation, Nigerian Civil Aviation Act 2006, and Civil Aviation (Investigation of Air Accidents and Incidents) Regulations.

In accordance with Annex 13 to the Convention on International Civil Aviation, it is not the purpose of aircraft accident/serious incident investigations to apportion blame or liability.

Readers are advised that Accident Investigation Bureau investigates for the sole purpose of enhancing aviation safety. Consequently, Accident Investigation Bureau reports are confined to matters of safety significance and should not be used for any other purpose.

As the Bureau believes that safety information is of great value if it is passed on for the use of others, readers are encouraged to copy or reprint for further distribution, acknowledging the Accident Investigation Bureau as the source.

Recommendations in this report are addressed to the Regulatory Authority of the State (NCAA). It is for this authority to ensure enforcement.

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GLOSSARY OF ABBREVIATIONS USED IN THIS REPORT

AAOC	Agricultural Aircraft Operator Certificate
ACE	Africa Contract Equipment
AE	Aircraft Engineer
AGL	Above Ground Level
AMO	Approved Maintenance Organisation
AOC	Air Operator Certificate
APC	Agricultural Pest Control
ATC	Air Traffic Control
ATPL	Airline Transport Pilot License
CEO	Chief Executive Officer
CPL	Commercial Pilot License
Do	Dornier
ELT	Emergency Locator Transmitter
EMB	Embraer
FAA	Federal Aviation Administration
FCT	Federal Capital Territory
GPS	Global Positioning System

hPa	hectoPascal
HS	Hawker Siddeley
IR	Instrument Ratings
ME	Multi Engine
MET	Meteorology
MTMA	Maximum Take-off Mass Authorised
NCAA	Nigerian Civil Aviation Authority
Nig.CARs	Nigeria Civil Aviation Regulations
NTSB	National Transportation Safety Board
OPSPECS	Operations Specifications
PA	Piper Aztec
PIC	Pilot -In-Command
SEA	Skypower Express Airways Ltd
SIC	Second-In-Command
STC	Supplemental Type Certificate
TC	Type Certificate
UTC	Universal Time Coordinate
VFR	Visual Flight Rule

5N-BGZ

Aircraft Accident Report No: WESTLINK/2014/08/11/F

Registered Owner: Africa Contract and Equipment (ACE) Limited, International Airport, Kaduna State

Registered Operator: Westlink Airlines Limited Flat 1, Block 4, Gwaram close, off Abakaliki street, Area 3, Garki, Abuja FCT

Aircraft Type and Model: Piper Aztec 23-250

Manufacturer: Piper Aircraft Corporation, U.S.A.

Date of Manufacture: 1969

Serial No.: 27-4155

Registration Number: 5N-BGZ

Location: A Farm Land at Matseri Village, Kebbi State, Nigeria.
Coordinates 12.1172N, 4.0910E

Date and Time: 11th August 2014 at 1830hrs

All times in this report are local time, equivalent to UTC + 1 unless otherwise stated

SYNOPSIS

The Bureau was notified of the occurrence by the operator through a phone call on the 11th of August, 2014 at 2140hrs. Investigators were dispatched the following day, arriving the scene at 1800hrs and commenced investigation. All relevant stakeholders were notified accordingly.

On 11th August, 2014, at 1817hrs, 5N-BGZ, a Piper Aztec 23-250 aircraft operated by Westlink Airlines Ltd, on a Special (Training) Category, departed Birnin Kebbi airstrip for a low level VFR pest control exercise in Matseri Village, Bunza Local Government Area.

The aircraft climbed to 1000ft Above Ground Level (AGL), no reported adverse weather, clear skies with relative calm wind. On board the aircraft was the Pilot and an Observer. Ten minutes after take-off, 5N-BGZ arrived target field and made some passes overhead the field to check for low level obstacles before commencing spray. A first spray pass over the target field was made. On the second and final pass of the day, the Pilot and the Observer suddenly noticed an electric power distribution line which was almost at the same height/level with their flight path. The Pilot slammed in power on the throttle and the Observer instinctively followed through on control, the aircraft was pitched nose up in an attempt to clear the obstacle, but the tail plane of the aircraft collided with the electric power cables. Consequently, the aircraft impacted the ground some distance away from the power line. The power line was not detected during the

passes to check for low level obstacles. The two occupants disembarked unhurt but the aircraft was destroyed.

The accident occurred at coordinates 12.1172N, 4.0910E and elevation 865ft in daylight.

The investigation identified the following causal and contributory factors:

CAUSAL FACTOR

Inadequate visual lookout and failure to avoid the obstacle.

CONTRIBUTORY FACTORS

1. Inadequate planning and preparation for the flight.
2. Inadequate pilot training and experience on agricultural aerial work.
3. Limited regulatory guidance and oversight on agricultural operations.

Four Safety Recommendations were made.

1.0 FACTUAL INFORMATION

1.1 HISTORY OF THE FLIGHT

On 31st July, 2014, 5N-BGZ, a PA 23-250 operated by Westlink Airlines Ltd arrived Sokoto Airport (DNSO) from New Kaduna Airport (DNKA) at 1029hrs with four persons-on-board for an Agricultural Pest Control exercise. The company was engaged by the Federal Ministry of Agriculture and the States of Kebbi, Sokoto, and Zamfara. The exercise commenced in the evening of the date of arrival and continued for ten days during which Zamfara and Sokoto States were both covered.

On the morning of 11th August, 2014, the Pilot filed a VFR Flight Plan from Sokoto to Birnin Kebbi Airstrip to position the aircraft for the remaining pest control exercise. He acknowledged the absence of an Air Traffic Controller in Kebbi but accepted to land in Kebbi at his own discretion.

At 1009hrs, 5N-BGZ departed Sokoto and was cleared to climb to 4500ft as a VFR flight. The Pilot gave his estimates for control zone 1020hrs and destination at 1037hrs. The Communications terminated after control zone. The aircraft landed Birnin Kebbi airstrip at 1145hrs and thereafter, the crew went to rest in a hotel.

The crew reported for duty at about 1800hrs and departed Birnin Kebbi airstrip at 1817hrs for a low-level VFR operation in Matseri Village, Bunza Local Government Area.

The aircraft climbed to 1000ft AGL, no adverse weather was reported; rather there were clear skies with relative calm wind. On board the aircraft was the Pilot and an Observer. Ten minutes after take-off, 5N-BGZ arrived target field and made some passes overhead the field to check for low level obstacles before commencing Spray. A first spray pass over the target field was made. On the second and final pass of the day, the

Pilot and the Observer suddenly noticed an electric power distribution line which was almost at the same height with their flight path. The Pilot slammed in power on the throttle, and the Observer instinctively followed through on Control, the aircraft was pitched nose up in an attempt to clear the obstacle, but the tail plane of the aircraft collided with the electric power cables. The aircraft impacted the ground some distance away from the power line. The power line was not detected during the passes to check for low level obstacles. The two occupants disembarked unhurt, but the aircraft was destroyed.

The Pilot reported that there was no meteorological condition present to adversely affect vision and there were no pre-accident failures or malfunctions on the aircraft and its engines.

The accident occurred at coordinates 12.1172N, 4.0910E at an elevation of 865ft, 1830hrs daylight.

1.2 INJURIES TO PERSONS

Injuries	Crew	Passengers	Total in the aircraft	Others
Fatal	Nil	Nil	Nil	Nil
Serious	Nil	Nil	Nil	Nil
Minor	Nil	Nil	Nil	Not applicable
None	2	Nil	2	Not applicable
TOTAL	2	Nil	2	Not applicable

1.3 DAMAGE TO AIRCRAFT

The aircraft was destroyed.

1.4 OTHER DAMAGE

Some economic crops were destroyed, and a section of the power line was damaged.

1.5 PERSONNEL INFORMATION

1.5.1 Pilot

Nationality:	Ghanaian
Age:	25years
License No:	CPL 000778 (NCAA Validated)
License Validity:	12 th November, 2014
Aircraft Ratings:	C-172, PA 23-250
Medical Validity:	12 th May, 2015
Simulator Validity:	N/A
Total Flying Experience:	281hrs 55mins
On Type:	77hrs
Last 24hrs:	45mins

Last 7 days:	10hrs 20mins
Last 28 days:	12hrs
Last 90 days:	12hrs
Experience on agricultural operation:	15hrs

The Pilot holds a CPL ME/IR and was trained at Mish Aviation General Aviation/Flight Training School, Accra, Ghana. He completed the training on 25th July 2013 and was employed by the Training School in Ghana. In addition, the Pilot was to fly with a sister organisation, Westlink Airlines Ltd in Nigeria. The Pilot's licence was valid until 12th November 2014. Records from the Pilot's Log book indicated that between the 6th and 15th of April 2014, the Pilot had performed an Aerial photography exercise/Training/Aerial spray of 28 hours 50 minutes, in Kumasi, Ghana and was endorsed/signed out on 16th April 2014 by a Mish Aviation instructor who was the Observer on the incident flight. **See Appendix A.**

The Pilot reported for duty at about 1000hrs on the day of the occurrence. Records show that he had a rest period from 2200hrs on the 9th to 1000hrs on the 11th August, 2014.

1.5.2 The Observer

Nationality:	Nigerian
Age:	51years
License No:	ATPL 3489

License Validity: 25th March, 2015

Medical Validity: 8th May, 2014

Simulator Validity: N/A

Aircraft Ratings: EMB-110, PA-23, C-172, HS-800XR, Do-228, BE-300/350

Total Flying Experience: 9198hrs

On Type: 500hrs

Last 24hrs: Nil

Last 7 days: Nil

Last 28 days: Nil

Last 90 days: Nil

(Total flight hours for the Observer were as at 16/09/2013)


The Observer is the Co-founder and Chief Executive Officer (CEO) of both Mish Aviation and Westlink Airlines Services and has an Instructor's Rating on Single and Multi-engine aeroplanes having M.T.M.A of 5700kg or less.

The Observer also holds the position of the Accountable Manager and acted as an Observer on this particular operation and reported that, "it was an unwritten Company policy to carry an Observer on board with no particular qualification, but the Company has always used a Pilot". During the post-accident interview, the Observer reported to have been trained and certified in Aerial Work and had carried out several agricultural spray sorties. It is worthy of note that the Observer was the instructor who endorsed the Pilot's Log book following an Aerial photography exercise/Training/Aerial spray,

which was conducted and signed out on 16th April 2014. The investigation revealed that the Observer's medical certificate was not valid as at the time of the occurrence.

1.6 AIRCRAFT INFORMATION

1.6.1 General Information



Type:	Aztec 23-250
Serial No:	27-4155
Operator:	Westlink Airlines Limited
Manufacturer:	Piper Aircraft Corporation, USA
Year of Manufacture:	1969
Airframe Time:	5943hrs 52mins
Total Landings/Cycles:	1594
Certificate of Insurance:	10th December, 2014
Certificate of Airworthiness:	12th July, 2015

The 5N-BGZ, PA23-250 was initially registered under the Air Operator Certificate (AOC) of Sky Power Express Airways Ltd (SEA), which also performed maintenance of the aircraft as an Approved Maintenance Organization (AMO). 5N-BGZ was equipped for specialised aerial work operation; aerial photography, banner towing, survey and mapping. In addition, the aircraft was modified to carry out agricultural spray

operation. The modification involves the installation of a 440 litre capacity Sorensen tank and a spray boom under the belly of the aircraft. The modification was carried out by Sky Power Express Airways Ltd at their maintenance facility in Kaduna International Airport on 11th December, 2006 with an NCAA approval number "NCAA/AD.1098AT/BGZ/001" dated 30th April, 2007. **See Appendix E.** A tail boom was also installed but was not covered in the documentation.

On April 26, 2013, a letter of notification was sent to Ghana Civil Aviation Authority by Mish Aviation Flight Training School, that 5N-BGZ was approved and listed in their training specifications to be used for multi-engine conversion training on lease basis.

The aircraft was transferred and re-issued with certificate of registration No.:1143 on 11th September, 2013 by the NCAA indicating Westlink Airlines Ltd as the registered operator and Africa Contracts and Equipment Ltd as the owner. The aircraft was issued with a valid airworthiness certificate on Special (Training) category. On 22nd October, 2013, Westlink Airlines Ltd applied to NCAA for approval to re-install the Sorensen tank on the aircraft. The approval was granted on 16th December, 2013 with reference to the earlier approval granted to Sky Power Express in 2007, **see Appendix F.** The reinstallation was carried out by the same AMO on 6th September, 2013. The aircraft mass and balance was performed after the reinstallation and the reports of weight and balance, certificate of release to service were issued on 6th September, 2013 by the AMO. **See Appendix B1, B2, B3.** Thereafter, the aircraft was included in the Agricultural Operations Specifications. **See Appendix C.**

The aircraft Techlog pre-departure section was not properly endorsed for flight on the day of the occurrence.

There was no documented evidence of any deferred defects and any outstanding Airworthiness Directives (ADs) or Service Bulletins (SBs)



5N-BGZ

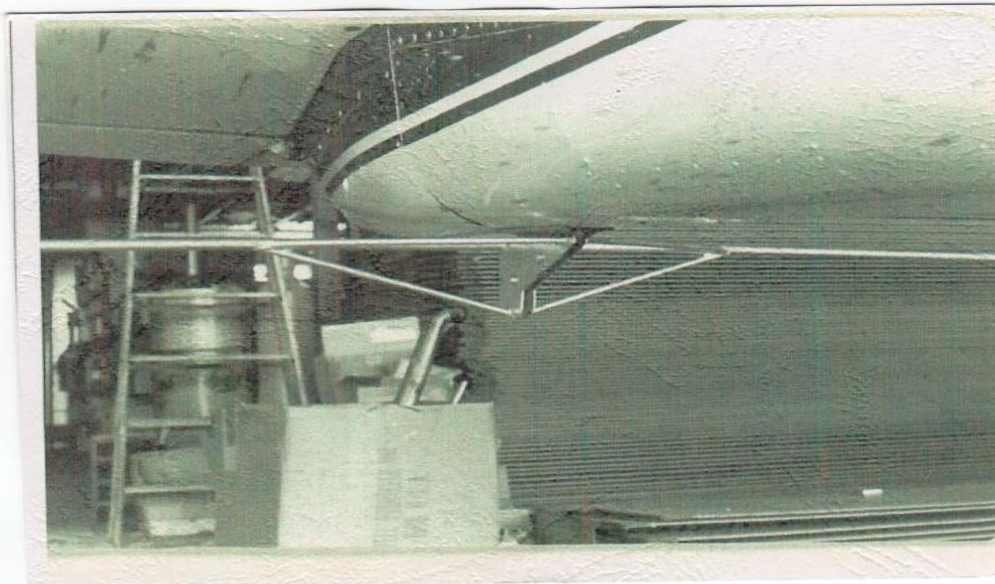


Figure 1: The Tank and Spray Boom

1.6.2 Power Plant

	Engine No. 1	Engine No. 2
Manufacturer:	Lycoming	Lycoming
Year of Manufacture:	NIL	NIL
Type/Model:	IO-540	IO-540
Serial number:	RL-20116-48E	RL-20850-48E
Time Since New:	259Hrs 55Min	259Hrs 55Min
Cycle Since New:	191	191
Fuel used:	Avgas 100LL	

The engines were installed on the aircraft on 28th November, 2012.

Propellers

	No.1	No. 2
Manufacturer :	Hartzell	Hartzell
Hartzell Type/Model :	HC-EZYR2RBSF/2465-7R	HC-EZYR2RBSF/2465-7R
Serial number :	BP 2864	BP8645
Time since new :	253Hrs 27 Min	253Hrs 27 Min

The propellers were installed on 12th December, 2012.

Both engines and propellers were serviceable and maintained in accordance with approved maintenance schedule and specifications.

1.7 METEOROLOGICAL INFORMATION

At 1600UTC

Wind: Calm
Visibility: 9999
Weather: Nil
Cloud: Few 020
Temp/Dew : 31°C / 23°C
QNH : 1015 hPa

At 1700UTC

Wind: Calm
Visibility: 9999
Weather: Nil
Cloud: Few 020
Temp/Dew: 31°C / 23°C
QNH: 1015 hPa

The Pilot reported that there was no meteorological condition present to adversely affect vision.

1.8 AIDS TO NAVIGATION

Not applicable.

1.9 COMMUNICATIONS

There was effective two-way communication between the aircraft and Sokoto ATC.

1.10 AERODROME INFORMATION

Not Applicable

1.11 FLIGHT RECORDERS

The aircraft was not equipped with a flight data recorder or a cockpit voice recorder. Neither recorder was required by the relevant aviation regulations.

1.12 WRECKAGE AND IMPACT INFORMATION

The accident site is a flat piece of farm land with a few scattered trees, full grown millet and maize stalks of an average height of 2.0m. A power line crosses the farmland (East-West) almost perpendicular to the flight path.

The aircraft impacted the power line in a nose up attitude. The power line sheared off the left side horizontal stabilizer from its attachment point, the aircraft rolled to the

right, impacted the ground, skidded a few meters and finally came to rest on a heading 023° magnetic as seen from the compass in the cockpit.



Figure 2: Power lines Snapped off across aircraft flight path



Figure 3: Electricity Distribution Concrete Pole brought down when the aircraft collided with the Power lines.



Figure 4: Snapped Electricity Cables



Figure 5: Ground Impact Marks made by the Aircraft at the Crash Site



Figure 6: Compass Magnetic Heading showing the resting position of the wreckage.

The aircraft radome was crushed, the right engine was crushed, and dislodged from its attachment points. The right leading edge protection device was ripped open. The tail end section of the fuselage suffered a bending stress to the right, with the left side horizontal stabilizer sheared off at its attachment point. The left section of the aircraft was relatively intact, with a slight damage to the engine cowling and the propeller tips.

The Sorensen tank and spray booms installed under the belly of the aircraft were crushed and detached from their strap and attachment points. The wreckage trail and impact marks at the crash site were distorted by rainfall and locals.



Figure 7: Side View of the Aircraft wreckage

Accident Investigation Bureau

Murtala Muhammed International Airport. P.M.B. 016 Ikeja, Lagos. Nigeria.

Aircraft Accident Report Form
Commercial Air Transport

24hrs Emergency Lines:

14 SKETCH Part 2

Show North and site elevation (amsl). If accident occurred on an airfield for which there is no published information, please provide as much detail as possible.

Any photographs of the site and / or aircraft would greatly assist the investigation.

PLAN VIEW
NOT TO SCALE

Figure 8: Sketch of the wreckage site

1.13 MEDICAL AND PATHOLOGICAL INFORMATION

No medical test was carried out on the crew after the occurrence.

1.14 FIRE

There was no evidence of fire in flight or after the impact.

1.15 SURVIVAL ASPECTS

The two Pilot s evacuated the aircraft unassisted immediately after the crash. The Emergency Locator Transmitter (ELT) installed on the aircraft was serviceable and operating as designed as at the time investigators arrived the scene.

The accident was survivable as the fuselage remained intact and as a result, a liveable space/volume was left for the occupants. The absence of post-crash fire also contributed to the survivability. The crash worthiness of the aircraft was attributed to the low impact forces.

1.16 TEST AND RESEARCH

Not applicable.

1.17 ORGANIZATIONAL AND MANAGEMENT INFORMATION

1.17.1 Westlink Airlines Limited

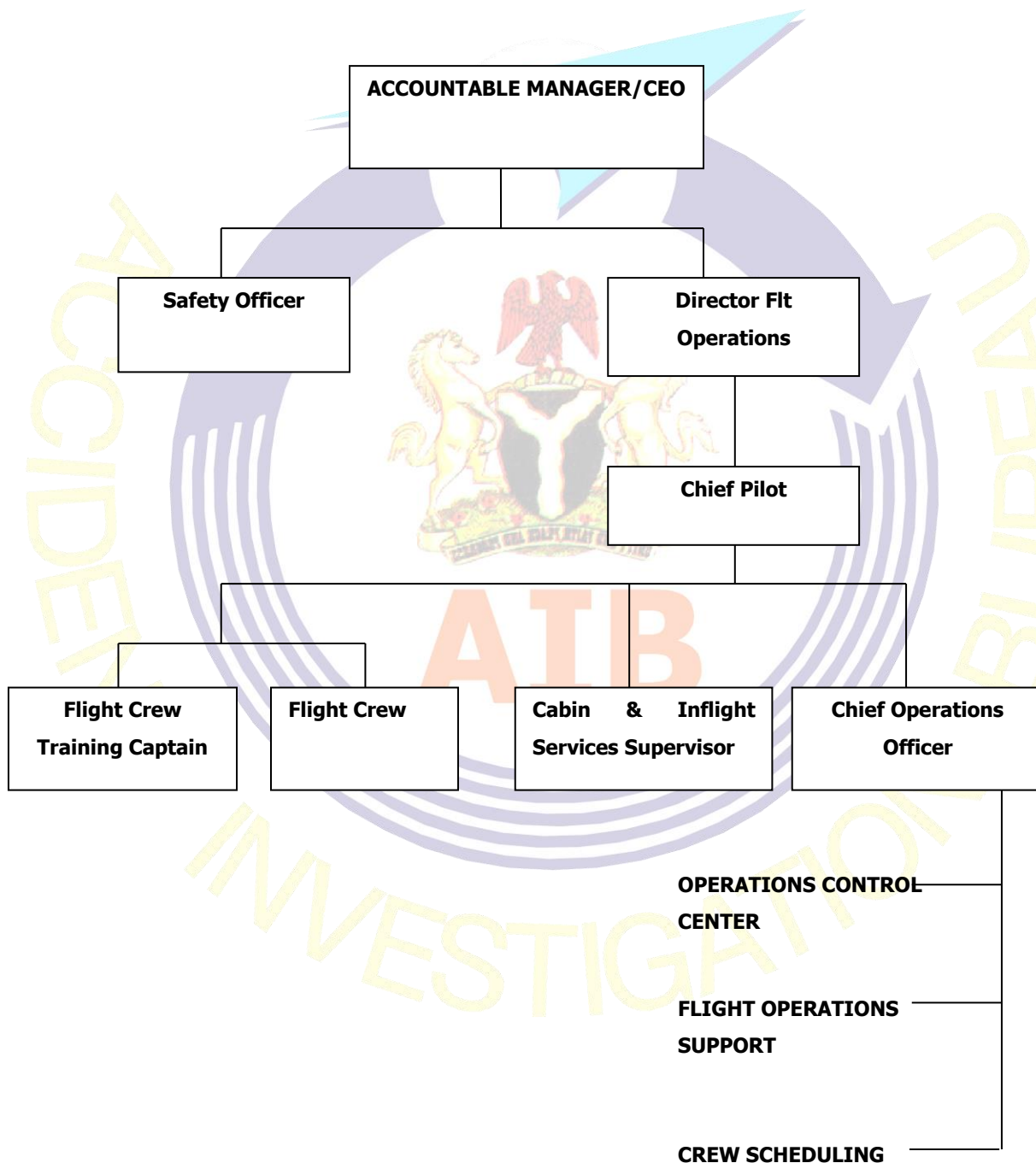
Westlink Airlines Limited was incorporated as a private limited liability Company on 31st December, 1999. The airline obtained its Airline Transport License (ATL) in April, 2010 from the Nigerian Civil Aviation Authority (NCAA). On 16th May, 2013 Westlink Airline was issued an Air Operator Certificate (AOC) with reference number WLA/AOC/02-11/002 for Transport (Passenger) operations. The AOC authorises the Airline to operate scheduled and non-scheduled passenger and cargo flights within and outside Nigeria.

Both Westlink Airlines Ltd and Mish Aviation (of Nigeria & Ghana) are subsidiaries of Africa Contracts & Equipment (Nigeria) Limited (ACE). ACE was founded in 2004 by a group of aviation professionals with their headquarters at Hangar 1, Skypower Express Airways, Kaduna International Airport, Kaduna.

Westlink Airlines Ltd also provides special aerial flight Services in aerial pest control, crop dusting, aerial photography and banner towing.

Westlink Airlines Ltd Operations Manual Part A Section 1

Organizational Structure – Flight Operations Department



DESCRIPTION OF ORGANISATIONAL STRUCTURE

The management is headed by a senior corporate official who is the accountable manager and has the overall accountability including the authority and control of the resources necessary to finance, implement and enforce policies and procedures with the operation.

- a. The Company Board of Directors appoints the WESTLINK AIRLINES Management*
- b. The accountable Manager of WESTLINK AIRLINES sees to the day to day running of the company. He has under him a management team who performs assigned functions to help achieved the company cooperate goals. He is also the Accountable Manager for the Nig. CARs part 6 Approved Maintenance Organisations.*
- c. Other key officers and the overall organisations of WESTLINK AIRLINES are as contained in the general Company Organogram.*

RESPONSIBILITIES AND DUTIES OF FLIGHT OPERATIONS MANAGEMENT PERSONNEL

The authorities, duties and responsibilities for all personnel with either direct or indirect responsibility in the Flight Operations Department are specified as follows:

- 1. The ACCOUNTABLE MANAGER is the Chief Executive Officer*
- 2. The DIRECTOR OF FLIGHT OPERATIONS is responsible to the Accountable Manager for the development and implementation of flight operations policy.*

3. The CHIEF PILOT is responsible to the Director of Operations for the safe and efficient operation of WESTLINK AIRLINES Fleet of aircraft and the management of its flight crew training resources.

4. The Director of Safety is responsible to the Accountable Manager through [sic] the Director of Safety as the focal point and driving force for the control of the company's safety program.

Extract: Westlink Airlines Ltd Operations Manual Part A

Operational Procedures

8.5.1.1 CREW MEMBER REQUIRMENTS STATES THAT:

No person may serve as a Pilot -in-Command or Aircraft Engineer of Pest Control Aircraft engaged in Aerial Pest Control activities unless they meet the following requirements.

1. Each person must have completed the prescribed Basic Aerial Pest Control Training. They must hold NCAA certificate of Authority.
2. Meet recent flight/engineering experience requirement of NCAA.
3. The appropriate fleet manager shall determine a crewmember's recency of experience and ability to accomplish the assigned scheduled mission.

8.5.1.2 PRE-MISSION PROCEDURES

Prior to departing on an Aerial Pest Control Operation, the following shall be accomplished:

1. PILOT -IN-COMMAND DUTIES

(a) Ensure that all necessary pre-mission briefings, flight release, and coordination are accomplished, i.e.

- 1. Aircrew briefing*
- 2. Flight release*
- 3. Air Traffic coordination*
- 4. Security coordination*
- 5. Safety briefing*
- 6. Comply with any additional requirement of APC-50PC-716-1*
- 7. Ensure that all documentation necessary to accomplish Aerial Pest Control Mission is aboard the aircraft.*
- 8. Carry out safety inspection of all ground equipment for the mission.*
- 9. Check maps, charts of operational areas for correctness and currency.*
- 10. Check chemical expiration date.*
- 11. Check protective gear for the chemical handlers.*
- 12. Ensure that First Aid Kit is available, complete and up to date (i.e. no expired drug).*

2. SECOND-IN-COMMAND DUTIES (SIC):

(a) Execute those duties that are assigned by the Pilot -in-Command (PIC).

3. AIRCRAFT ENGINEER DUTIES (AE)

The AE will comply with the following items appropriate to the aircraft being operated specified in the aircraft manual in addition.

- (a) Ensure the operational status of the aircraft and associated equipment to support the scheduled mission.*
- (b) Review the Aircraft flight log for aircraft equipment discrepancy and write up any recent maintenance action that might impact the mission.*
- (c) Ensure that necessary auxiliary equipment and supplies are Operational and stowed aboard the aircraft to support the schedules mission*

8.5.1.3 MISSION PROCEDURES

The following procedures shall be accomplished during Pest Control Mission.

- 1. General Flight Crew porcedures:*
 - (a) The left seat Pilot will manoeuvre the aircraft, assist with communication/coordination and maintain air traffic vigilance.*
 - (b) The right seat Pilot will assist in looking for other air traffic, communicate and coordinate manoeuvre with air traffic control (ATC), program the GPS coordinates of the area of operation and file flight plan.*
- 2. The operational area must be surveyed in two phases. Phase one at sunrise and Phase two at sun set. In the case of Quella Birds and Locusts conduct survey as follows:*

PHASE ONE

- a) Check area for Low Level obstacles, for example tall poles/masks, high tension wires, high elevation terrain, trees, etc.
- b) Check direction of the sun in relation to the direction of the swath run.
- c) Check wind direction and possible wind speed over the target area.
- d) Check correctness of target GPS coordinates.

PHASE TWO

- a) Check for Birds nesting area at dawn and sun set.
- b) Check time by which sun rises and sets at target area.
- c) Cross check marked obstacles and display, acknowledge of their locations.
- d) Pick an emergency landing area in each mission area.

There was no document to indicate compliance with pre-mission procedures that are contained in the company operations manual.

Westlink Airlines Ltd Operations Manual Part D

The Company Operations Manual Part D (Training Manual) does not contain detailed guidance on the Basic Aerial Pest Control Training for personnel conducting agricultural aerial work as required.

On the day 5N-BGZ was to depart from its operational base in Kaduna, the PIC was initially paired to fly with another Pilot but that Pilot was not available. Instead, a Pilot, was used as an Observer. In addition, the Observer was to flag off the exercises in all the three states. He reported that it was an unwritten Company policy to carry an

Observer on board with no particular qualifications, but the Company had always used a Pilot.

1.17.2 Nigerian Civil Aviation Authority (NCAA)

The Nigerian Civil Aviation Authority (NCAA), the apex regulatory body, performs safety oversight on the activities of all Airlines, Approved Maintenance Organisations, Airports, Airstrips, Heliports, Air Navigational Aids, Aviation Training Organisations, and all Aviation personnel. NCAA watches over the entire industry.

5.3 TYPE CERTIFICATES AND SUPPLEMENTAL TYPE CERTIFICATES

5.3.1.1 APPLICABILITY

(a) This Subpart prescribes procedural requirements for the acceptance of a type certificate and the issue of supplemental type certificates.

5.3.1.2 ACCEPTANCE OF A TYPE CERTIFICATE

a) The Authority may accept a type certificate or equivalent document issued by a state of design in respect of an aircraft or aircraft component if :

(1) The type certificate or equivalent document was issued based on an airworthiness code recognized by the Authority ; or

(2) The design, materials, construction equipment, performance and maintenance of aircraft or aircraft component technical evaluation against a recognized airworthiness code has been carried out by the Authority and has been found to :

(i) Meet the required standards of the recognized airworthiness code; or

(ii) Has compiled with any recommendations required by the Authority.

(b) Upon acceptance of the type certificate by the Authority, the Authority may, prior to issue of standard or special certificate of airworthiness, require the applicant to comply with any additional requirements as prescribed by the Authority.

(c) In this regulation, recognised airworthiness code means standards relating to the design, materials, construction equipment, performance and maintenance of aircraft or aircraft component issued by the States of design are in compliance with Annex 8 to the Chicago Convention.

5.3.1.3 ISSUANCE OF A SUPPLEMENTAL TYPE CERTIFICATE

(a) Any person who proposes to alter a product by introducing a major change in type design, not great enough to require a new application for a type certificate, shall apply for a Supplemental Type Certificate to the regulatory agency of the State of Design that approved the type certificate for that product, or to the State of Registry of the aircraft provided that the State of Registry has the technical expertise to evaluate the proposed change in accordance with the type design. The applicant shall apply in accordance with the procedures prescribed by that State.

(b) The Authority, upon receiving a request for a supplemental type certificate for an aircraft registered in Nigeria shall forward the request to the State of Design.

Regulations for Aerial Work

Part 11 of the Nigeria Civil Aviation Regulations (Nig. CARs) 2009 sets forth the requirements for aerial work operations, including agricultural aviation, helicopter

external load carrying within Nigeria. In some instances, aircraft registered in Nigeria will be able to perform aerial work in contiguous states.

Section 11.1.1.2-(a)(3) Agricultural aircraft operation-The operation of an aircraft for the purpose of –

- (i) Dispensing any economic poison,*
- (ii) Dispensing any other substance intended for plant nourishment, soil treatment, propagation of plant life, or pest control, or*
- (iii) Engaging in dispensing activities directly affecting agriculture, horticulture, or forest preservation, but not including the dispensing of live insects.*

Section 11.2.1.1-(a) prescribes rules governing-

- (1) Agricultural aircraft operations within Nigeria; and*
- (2) The issue of commercial and private agricultural aircraft operator certificates for those operations.*

11.2.2.4 CERTIFICATION REQUIREMENTS

(a) General. Except as provided by paragraph (a)(3) of this section—

- (1) The Authority will issue a private agricultural aircraft operator certificate to an applicant who meets the requirements of this Subpart for that certificate.*

(2) *The Authority will issue a commercial agricultural aircraft operator certificate to an applicant who meets the requirements of this Subpart for that certificate.*

(3) *An applicant who applies for an agricultural aircraft operator certificate containing a prohibition against the dispensing of economic poisons is not required to demonstrate knowledge specific to economic poisons.*

(b) Pilots.

(1) *A private Operator-Pilot-applicant shall hold a current Nigerian private, commercial, or airline transport Pilot certificate and be properly rated for the aircraft to be used.*

(2) *A commercial Operator-Pilot applicant shall hold, or have available the services of at least one Pilot who holds a current commercial or airline transport Pilot certificate issued by the Authority and who is properly rated for the aircraft to be used.*

(c) Aircraft. The applicant shall have at least one certified and airworthy aircraft, equipped for agricultural operation.

(d) Knowledge and skill tests. The applicant shall show that it has satisfactory knowledge and skill of the following agricultural aircraft operations.

(1) Knowledge:

(i) Steps to be taken before starting operations, including a survey of the area to be worked.

(ii) *Safe handling of economic poisons and the proper disposal of used containers for those poisons.*

(iii) *The general effects of economic poisons and agricultural chemicals on plants, animals, and persons, and the precautions to be observed in using poisons and chemicals.*

(iv) *Primary symptoms of poisoning of persons from economic poisons, the appropriate emergency measures to be taken, and the location of poison control centres.*

(v) *Performance capabilities and operating limitations of the aircraft to be used.*

(vi) *Safe flight and application procedures.*

(2) *Skill in the following manoeuvres, demonstrated at the aircraft's maximum certified take-off weight, or the maximum weight established for the special purpose load, whichever is greater:*

(i) *Short-field and soft-field takeoffs (aeroplanes and gyroplanes only).*

(ii) *Approaches to the working area.*

(iii) *Flare-outs.*

(iv) *Swath runs.*

(v) *Pull-ups and turnarounds.*

(vi) *Rapid deceleration (quick stops) in helicopters only.*

11.2.3.6 **PERSONNEL**

(a) *Information.* The holder of an agricultural aircraft operator certificate shall insure that each person used in the holder's agricultural aircraft operation is informed of that person's duties and responsibilities.

(b) *Supervisors.* No person may supervise an agricultural aircraft operation unless he or she has met the knowledge and skill requirements of this Subpart.

(c) *Pilot-In-Command.* No person may act as Pilot-in-command of an aircraft operated under this Subpart unless that Pilot:

(1) Holds a Pilot certificate and rating prescribed by this Subpart as appropriate to the type of operation conducted; or

(2) Has demonstrated to the holder of the Agricultural Aircraft Operator Certificate conducting the operation, or to a supervisor designated by that certificate holder, that he or she possesses the knowledge and skill requirements of this Subpart.

1.17.3 **Approved Maintenance Organisation (AMO)**

Skypower Express Airways Ltd (SEA) is an NCAA Approved Maintenance Organisation with reference number AMO/5N/SEA first issued on 23rd July, 2008. The AMO Certificate as at the date of occurrence had been renewed on 8th January, 2014 and was valid till 7th January, 2016. Skypower Express Airways Ltd is located at Kaduna International Airport, Kaduna State.

The AMO holds limited ratings on certain airframes and powerplants as per Nig.CARs (6.2.1.11). The AMO Operations Specifications contain the comprehensive list of ratings and Limitations of SEA AMO. Piper Aztec PA-23-350 is shown on the Operational Specifications (OPSPECS) instead of PA-23-250. See Appendix D.

On 30th April, 2007 approval number "NCAA/AD.1098AT/BGZ/001" was issued to the AMO to carry out the modification on the aircraft by NCAA.

The application, with the Supplemental Type Certificate (STC) and relevant documentation for the issuance of the approvals to carry out the modification, were not contained in the files of the AMO and the operator domiciled with NCAA.

1.18 ADDITIONAL INFORMATION

1.18.1 Excerpts of Witness Account

During the post-accident interview and in response to the question of whether or not a ground survey was done, the crew reported that they were not aware of any survey done and that all they got was the coordinates of the site provided by the client.

The Federal Ministry of Agriculture and Rural Development as the client under its Pest Control Services Division, conducts training on chemical handling and as well coordinates the exercise with States prior to commencement.

1.18.2 Supplemental Type Certificates (STC)

EXTRACT FROM FEDERAL AVIATION ADMINISTRATION (FAA)

A Supplemental Type Certificate (STC) is a document issued by the Federal Aviation Administration approving a product (aircraft, engine, or propeller) modification. The STC defines the product design change, states how the modification affects the existing type design, and lists serial number effectivity. It also identifies the certification basis listing specific regulatory compliance for the design change. Information contained in the certification basis is helpful for those applicants proposing subsequent product modifications and evaluating certification basis compatibility with other STC modifications.

Possession of the STC document does not constitute rights to the design data or installation of the modification. The STC and its supporting data (drawings, instructions, specifications, etc.) are the property of the STC holder. You must contact the STC holder to obtain rights for the use of the STC.

Installation on the Airplane (STC not your own)

I've found a supplemental type certificate that I want to install on my airplane. What do I do now?

You must contact the supplemental type certificate holder to seek written permission. The supplemental type certificate and its related information – all drawings, data, specifications – are the property of the supplemental type certificate holder. FAA will not release this information without authorization from the owner.

See 14 CFR § 21.120, Responsibility of supplemental type certificate holders to provide written permission for alterations.

1.18.3 Preventing Obstacle Collision Accidents in Agricultural Aviation

(Extract from National Transportation and Safety Board NTSB USA Safety Alert Reference number SA-035)

Both unseen and known obstacles present unique hazards.

The problem:

- *Accidents involving collisions with obstacles are among the most common types of agricultural aircraft accidents. During 2013, 16 accidents involved aircraft that collided with poles, wires, guy wires, meteorological evaluation towers (MET), or trees while conducting agricultural-related activities.*
- *Some collisions involved obstacles that the Pilot s did not see (even during survey flights) but others involved obstacles that were known to the Pilot and/or had characteristics that would make them visibly conspicuous.*

What can Pilots and operators do?

- *Maintain a quick-reference document (paper or electronic) at the operations base that contains field maps, charts, photographs, and details of all known*

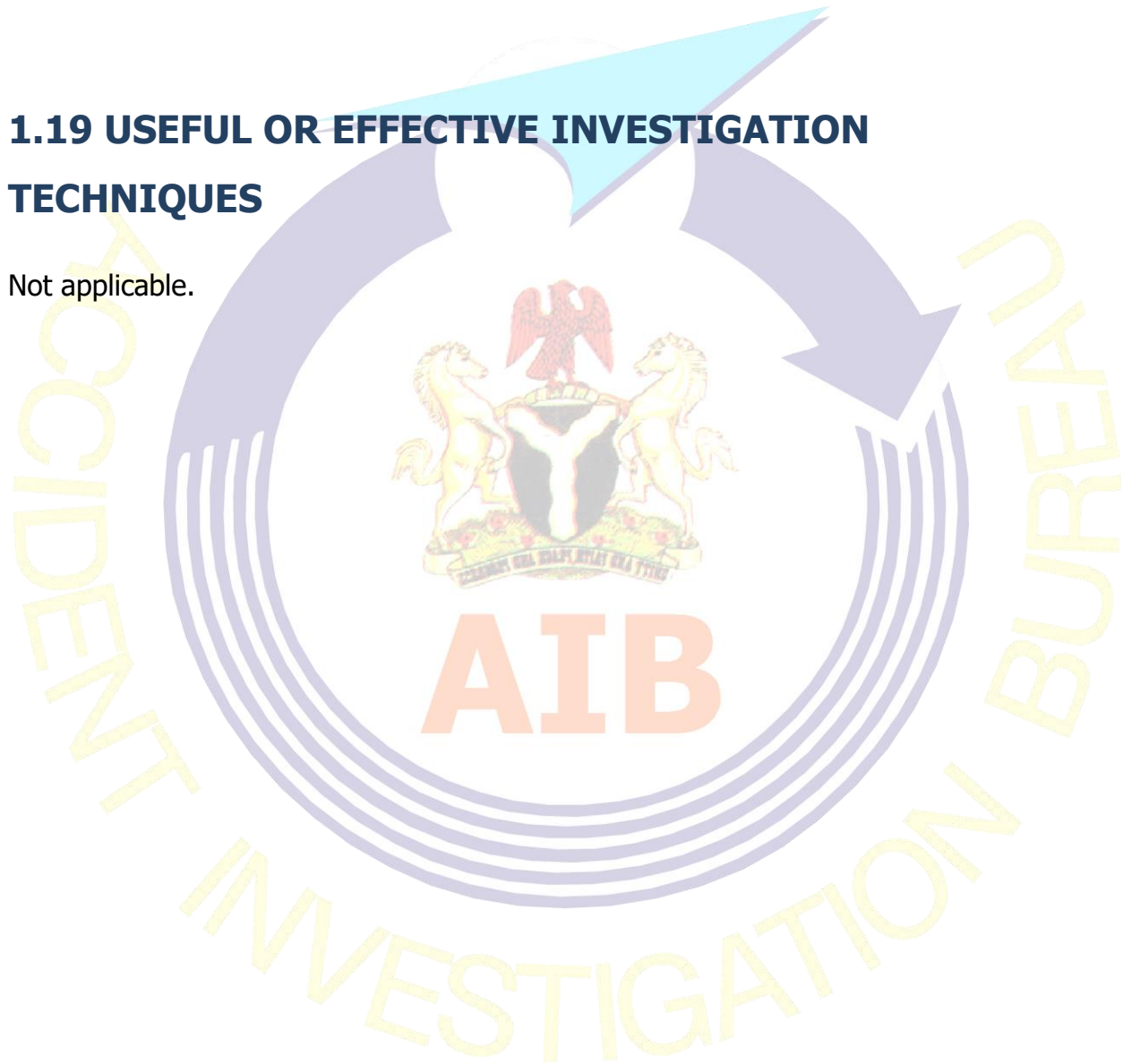
obstacles. Frequently review current aeronautical charts for information about obstacles.

- *Before you leave the ground, spend time becoming familiar with all available information about the target field and programming navigation equipment. Such pre-flight action can help reduce the potential for confusion or distraction in flight.*
- *Conduct aerial surveys of the target field but do not rely solely on an aerial survey to identify potential obstacles.*
- *Conduct regular ground surveys of fields. Some towers can be erected in hours, and obstacles can change since you last worked that field.*
- *When possible, use ground crews. They may be in a better position to see certain obstacles and help you ensure that your aircraft remains clear of them.*
- *Watch for shadows and irregularities in growth patterns to help identify obstacles.*
- *Speak with farmers and land owners to raise awareness about obstacle hazards.*
- *Use GPS and other technology to maintain awareness of obstacle locations.*
- *Be aware that workload, fatigue, sun glare, and distractions in the cockpit can adversely affect your ability to see, avoid, or remember obstacles.*
- *Understand the performance limitations and requirements for your aircraft, particularly when operating with heavier loads and at higher density altitudes.*

- *The National Agricultural Aviation Association's Professional Aerial Applicators' Support System reminds Pilot s that, when ferrying an aircraft or transitioning between sites, flying above 500 feet reduces obstacle collision risks.*

1.19 USEFUL OR EFFECTIVE INVESTIGATION TECHNIQUES

Not applicable.



2.0 ANALYSIS

2.1 GENERAL

Westlink Airlines Limited is a holder of both Air Operator Certificate (AOC) and Agricultural Aircraft Operator Certificate (AAOC).

The prescribed Basic Aerial Pest Control Training, as required in the Company Operations Manual Part-A, is not contained in the Company Operations Manual Part-D (Training).

5N-BGZ was maintained, modified and certified for Aerial Work. There was no reported pre-accident failures or malfunctions on the structures, powerplants and systems.

According to records, the Pilot had a rest period of about 36hours before the occurrence flight, which is far in excess of the Company's minimum requirement of 8hours.

There was no adverse weather reported on the day of the occurrence. Therefore, weather was not considered to be a factor in this occurrence.

Pre-mission procedures are contained in the company operations manual part A, but Westlink Airlines could not provide any evidence of compliance with these procedures for all the missions conducted.

2.2 FLIGHT OPERATIONS

2.2.1 Occupants

(a) The Pilot

Section 11.2.3.6(c)(1)(2) of the Nigeria Civil Aviation Regulations, 2009 clearly stipulates the requirements for the Pilot of an aircraft in relation to the type of operation conducted.

The Pilot had a valid License and rating to fly the aircraft type.

The only records available on the Pilot's training on aerial work as contained, indicates that between the 6th and 15th April, 2014, the Pilot had performed Aerial photography exercise/Training/Aerial Spray of 28hours 50minutes. The said training was not based on any of the company's' curriculum.

(b) The Observer

The Observer reported during the Investigation interview that he was trained and certified in Aerial Work and had carried out several agricultural spray sorties. The Pilot's Log book indicated that on 16th April, 2014, the Observer acted as his Instructor on Aerial photography/Spray training exercise, in Kumasi, Ghana.

The Observer reported in the Interview that he was an Observer on this operation and that it was an unwritten Company Policy to carry an observer who does not need to have any particular qualification, and that the Company had always used a Pilot for that purpose. The Company Approved Operations Manual sections 8.5.1.1 and 8.5.1.2 states the duties and responsibilities of the PIC and

SIC respectively for this type of operation. Therefore, this statement by the Observer is contrary to what is stated in the Operations Manual.

However, the Observer performed the following duties in this operation:

"performed the flag-off ceremony, which required addressing the media as well as public address. This was to ensure the re-launch/establish relationship with the Kebbi Government."

and

"as an experienced person in the exercise and the area, assist the young pilot understand the terrain and perfect high skills",

Based on the above responsibilities performed by the Observer, he acted as an Instructor, despite having an *expired License*. *In addition, his Medicals had also expired.*

2.2.2 Conduct of the Flight

The Aircraft departed Birnin Kebbi Airstrip at 1817hrs under Visual Flight Rules (VFR) in good meteorological conditions. The Pilot reported that there were no meteorological conditions present to adversely affect their vision. Sunset observed on the day of the occurrence was at 1805UTC.

Ten minutes after departure, at about 1827hrs, the aircraft arrived the target area, flew overhead for reconnaissance, turned back and commenced Spray.

At about 1830hrs the aircraft collided with the power line. This indicated that the time interval between arrival at the target area and time of impact was about three minutes. The investigation showed that three minutes may not have been adequate to perform a thorough reconnaissance as well as spray application.

As there was no evidence of a Ground Survey of the target field, the Aerial Survey conducted by the Pilot could not identify the obstacle

This occurrence was a case of an unknown obstacle; therefore, the next line of defence would be proper Pilot look out.

Operators of Agricultural Aerial Spray are required to carry out adequate planning and preparations prior to the conduct of such exercises. The Nig. CARs and Company approved Operations Manual require the conduct of Ground and Aerial Survey of the target fields.

The requirement is for an initial survey of the target field using up-to-date survey map and/or operational area charts, to mark obstacles, display, cross check and acknowledge their locations.

Additionally, the Company Operations Manual under Mission Procedures stipulates that the operational area must be surveyed in two phases. Phase One at Sunrise, and Phase Two at Sunset.

During the Investigation Interview and in response to the question of whether a Ground Survey was done, the occupants reported that they were not aware of any survey done and that all they got were the coordinates of the site provided by the client. The investigation revealed that a proper Ground Survey would have

identified the obstacles and their locations marked for avoidance during the spray, in accordance with Westlink Airlines Ltd Operations Manual Part A 8.5.1.3 (Mission Procedures).

2.2.3 Maintenance/Records and Modification Status of the Aircraft

Aircraft maintenance, repairs and modifications are carried out by Skypower Express Ltd at its Kaduna International Airport facility.

The maintenance records indicated that the aircraft was maintained and issued with a valid airworthiness certificate.

The aircraft was modified to carry out agricultural spray operations; installation of a 440litre capacity Sorensen tank and spray booms under the fuselage of the aircraft. The aircraft Mass and Balance was performed and the reports of Weight and Balance, Certificates of Release to Service were issued by the AMO. The aircraft Mass loading and its Centre of Gravity were within the prescribed limits and there was no evidence of airframe failure or system malfunction prior to the occurrence.

The Nig. CARs Subparts 5.3.1-3, prescribes procedural requirements for the acceptance of a type certificate and the issue of supplemental type certificates.

From records available, the investigation could not verify the source of the procedures used to carry out the modification (installation of Sorensen Tank and the rear Spray Boom).

2.3 NIGERIAN CIVIL AVIATION AUTHORITY (NCAA)

The NCAA is the apex regulatory body charged with the regulation and oversight activities on all aviation service providers.

The Nig.CARs Part 11 sets forth the requirements for Aerial Operations. It also recognises that, the Annexes to the Convention on International Civil Aviation do not specifically address Aerial Work. Although Annexes 1 and 6 to the Convention on International Civil Aviation contain a definition of Aerial Work, the historical background section in the Forward of Annex 6, Part II, notes that this definition is included so that States will know that Annex 6 does not address Aerial Work.

NCAA issued both Air Operator Certificate (AOC) and Agricultural Aircraft Operator Certificate (AAOC) to Westlink Airlines Ltd to enable the company conduct airline services and aerial work. The investigation reveals that these approvals were given to the company without ensuring that the prescribed Basic Aerial Training section is contained/inserted in the relevant sections of the Company Operations Manual.

Additionally, the crew were required by the Nig.CARs to undergo a Basic Aerial Pest Control training and that they must hold Certificate of Authority. However, there was no evidence/certificate to show that both Occupants possess adequate knowledge and skills that qualify them to carry out Aerial Agricultural Work.

All Aviation Service providers applying to NCAA are required to provide statement of compliance with all relevant sections of Nig.CARs during the certification

process before appropriate approvals are issued. During the course of this investigation, it was discovered that approvals (AOC, AAOC and Modifications) were issued to Westlink Airlines Ltd without due diligence to standard procedures.



3.0 CONCLUSION

3.1 Findings

1. The Pilot had adequate rest period prior to the occurrence.
2. The Pilot was medically fit and had a valid License and rating on aircraft type.
3. The Pilot slammed in full power on the throttle, while the Observer also, instinctively, followed through on Control.
4. The Pilot was not able to detect the presence of the obstacle at the target field during aerial reconnaissance.
5. The Pilot did not report any pre-accident mechanical failures or malfunctions with the aircraft.
6. The CEO/Accountable Manager acted as the Observer/Instructor to replace the pilot originally scheduled for this operation.
7. The CEO/Accountable Manager was the Instructor that trained the Pilot on aerial work.
8. There was no certification nor any further relevant evidence to validate the Instructor's claim during Interview that he has adequate training in aerial crop spraying or agricultural spraying in general.
9. The License of the Observer/Instructor had expired on 8th May 2014, due to expiry of his Medical Certificate.

10. The Observer acted as an Instructor with an expired License.
11. The Operator's training manual does not contain the prescribed Basic Aerial Pest Control Training.
12. The Operator was certified by NCAA to carry out Aerial Agricultural Aircraft Operations.
13. The Aircraft had a valid certificate of airworthiness and had been maintained in accordance with an approved maintenance programme.
14. Westlink Airlines Ltd applied to NCAA for approval to re-install the Sorensen Tank on the aircraft.
15. Approval was granted on 16th December, 2013 although re-installation was carried out by the AMO on 6th September, 2013.
16. The source of the procedures used to carry out the modification; installation of the Sorensen Tank, Forward and Rear Boom could not be authenticated by the investigation.
17. The Tail Boom Sprayer installation was not contained in the documentation.
18. The Aircraft Technical Log-book Pre-Departure Inspection (PDI) section was not properly endorsed/signed out for flight dispatch on the day of the occurrence.

19. There was no evidence to show that Ground Survey of the site was conducted as required by the regulation prior to the commencement of spray exercise.
20. The NCAA Regulations and Guidance, Environmental Impact, Health and Safety issues on Agricultural Aerial Work is limited in scope.
21. There was improper documentation and record keeping of the Operator's files domiciled with the NCAA.
22. The OPSPECs issued on 25th February, 2014 to Skypower Express Airways (AMO) by NCAA indicated PA-23-350 Series instead of PA-23-250 Series.

3.2 CAUSAL FACTOR

Inadequate visual lookout and failure to avoid the obstacle.

3.3 CONTRIBUTORY FACTORS

1. Inadequate planning and preparation for the flight.
2. Inadequate Pilot training and experience on Agricultural Aerial Work.
3. Limited regulatory guidance and oversight on agricultural operations.

4.0 SAFETY RECOMMENDATIONS

4.1 SAFETY RECOMMENDATION 2017-043

NCAA should ensure that applicants/certificate holders develop a comprehensive training manual for personnel involved in Aerial Work Operations.

4.2 SAFETY RECOMMENDATION 2017-044

NCAA should enhance its oversight function and establish a means of compliance by the operators of Agricultural Aerial Work.

4.3 SAFETY RECOMMENDATION 2017-045

NCAA should ensure proper verification, documentation and secure record keeping of all documents submitted to it by aviation service providers.

4.4 SAFETY RECOMMENDATION 2017-046

NCAA should review the requirements in Part 11(Aerial Work) of the Nigerian Civil Aviation Regulations. Any amendment to these regulations should also take into consideration, issues of Health and Safety, Environmental Protection, Standards and Safety of Economic Poisons, in cooperation with other regulatory agencies concerned.

RESPONSES TO SAFETY RECOMMENDATIONS.

NCAA Responses on AIB Safety Recommendations

NCAA responded to Safety Recommendation 4.1 (2017-043) as follows:

"The knowledge and skill requirements for personnel involved in Agricultural Work Operations are detailed in Nig.CARs 11.2.2.4 (d). These requirements ensure the competency of these personnel in conducting such operations"

NCAA responded to Safety Recommendation 4.2 (2017-044) as follows:

"In compliance with its surveillance obligations, the NCAA establishes and implements an annual surveillance plan, which covers organizational, maintenance and operations activities of certificate holders, including operators of Agricultural Aerial Works. Chapters 30 and 32 (Continuing Surveillance) of the Operations and Airworthiness Inspectors Handbook respectively, contain the surveillance methodology and the minimum events by which the Authority continuously monitor operations conducted by certificate holders."

NCAA responded to Safety Recommendation 4.3 (2017-045) as follows:

" The Directorate of Airworthiness Standards (DAWS) keeps records of modification and repairs accomplished on Nigerian Registered aircraft in the Technical Files Control Centre (TFCC). The Modification and Repair Records (AD. 1098) consists of a Control File, containing a list of all Airworthiness modifications/repairs reference numbers issued to certificated entities, a summary of applications (Airworthiness Form AC-AWS014; Request for Major

Modification and Repair Approval) and maintenance records (Airworthiness Form AC-AWS014A; Major Repair and Alteration Records), and the individual organizational Modification/Repair File, containing the Approved Data (Supplemental Type Certificates (STCs), Approved Engineering Drawings etc.), Engineering Order or other documents containing the modification/repair procedures and copies of accomplished post-modification requirements.”

NCAA responded to Safety Recommendation 4.4 (2017-046) as follows:

"The requirements covering the Economic Poison Dispensing, Manner of Dispensing and the Safety Recommendation 2017-046 have been adequately addressed in the Nig.CARs 11.2.3.4 and 11.2.3.5.

5N-BGZ

APPENDICES

APPENDIX A

PILOT'S LOG BOOK endorsed/signed out by the Instructor.

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DATE LOCAL	AIRPORT TYPE	ROUTE OF FLIGHT		REMARKS AND ENDORSEMENTS	AIRCRAFT CATEGORY		CONDITIONS OF FLIGHT		TYPE OF PILOTING TIME		TYPE CLASSIFICATION OF FLIGHT
		FROM	TO		AS TO LOG	AS TO LOG	ACTUAL REMARKS PAGE	FLIGHT INSTRUMENT PAGE	FLIGHT INSTRUMENT PAGE	FLIGHT INSTRUMENT PAGE	
24	PA-23	PA-23	PA-23								
25	PA-23	PA-23	PA-23								
26	PA-23	PA-23	PA-23								
27	PA-23	PA-23	PA-23								
28	PA-23	PA-23	PA-23								
29	PA-23	PA-23	PA-23								
30	PA-23	PA-23	PA-23								
31	PA-23	PA-23	PA-23								
1	PA-23	PA-23	PA-23								
2	PA-23	PA-23	PA-23								
3	PA-23	PA-23	PA-23								
4	PA-23	PA-23	PA-23								
5	PA-23	PA-23	PA-23								
6	PA-23	PA-23	PA-23								
7	PA-23	PA-23	PA-23								
8	PA-23	PA-23	PA-23								
9	PA-23	PA-23	PA-23								
10	PA-23	PA-23	PA-23								
11	PA-23	PA-23	PA-23								
12	PA-23	PA-23	PA-23								
13	PA-23	PA-23	PA-23								
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29	PA-23	PA-23	PA-23								
30	PA-23	PA-23	PA-23								
31	PA-23	PA-23	PA-23								
				TOTALS THIS PAGE							
				AMT. FORWARDED							
				TOTALS TO DATE							

I certify that the entries in this log are true.

PILOT SIGNATURE: *[Signature]*



5N-BGZ


APPENDIX B1

SORENSEN TANK INSTALLATION PROCEDURE

SKYPOWER EXPRESS AIRWAYS NIG. LTD.		ATA #:	DATE: 06-09-13	
A/C TYPE: PA-23-250	REG N: 5N-BGZ.	ZONE:	CARD #: ST02	
TITLE: INSTALLATION OF SORENSEN SPRAYING TANK		Est. Time Taken:	SKILL: A & C.	
INSPECTION REQUIREMENTS			ENGR/ MECH	INSP
MATERIALS	: Supplied brace pads, bolts, nuts, clamps, straps and booms			
REF. DOC.	: Sorensen Tank Installation Sheet			
<p>1. Using four (4) lower boom brackets No. 84-02 attach them to lower surface of wing as follows:</p>				
<p>2. Along outboard wing rib, mark and drill holes to fit two (2) of the brace pads. Using rivnuts bolt the pads in place and attach outboard braces. On rib between the two gasoline tanks mark holes and install rivnuts for two (2) inboard braces and attach. Install the booms to braces using the four (4) boom clamps, pointing the boom inlet, fitting up and inboard brace toward aileron hinge point (approximately 45 degrees upward). Remove four (4) inspection plates at wing root area where spars enter the fuselage. On the rear 2 points, attach the two "1" shaped tank strap brackets.</p>				
<p>3. On the front two points, bolt the two special angle fittings with vertical side outward. On the two brackets on the RIGHT side, attach the #1-2-3&4 numbered from front to back. To the RIGHT upper side of power console in cockpit, bolt on the Pressure Extension Assembly and the Dump Valve Assembly cable to be routed behind the power console, through and between floor and lower skin, and rearward but through bottom of the airplane through the inspection area. Route wires out through the same area and position tank under the airplane. Attach with straps and tighten down, positioning boom tubes from front of tank over top and out through the slots in top of tank on both sides, through adel clips forward of the flaps and through 90 degree fittings to the boom. Position Pressure Gauge under panel below RIGHT side of control column and bolt circuit breaker next to it. Position Toggle Switch where convenient and make all electrical connections. Route Dump Valve cable along RIGHT side and fasten with clip to #1 strap and hook up to Dump Valve.</p>				
<p>4. Mount Solenoid to back side of the forward baggage compartment and connect up. Check Pressure Control and Gauge; check Dump Valve for proper activation and reinstall cover. Check pump and motor, check all connections and attachments and CHECK FREEDOM OF ALL AIRCRAFT CONTROLS FOR FREE MOVEMENT OF CONTROL SURFACES.</p>				

APPENDIX B2

AIRCRAFT MASS AND BALANCE REPORT



SKYPOWER EXPRESS AIRWAYS
NIGERIA LIMITED

Kaduna International Airport
PO Box 16737, Kaduna, Nigeria

Tel: +234-8033741
Tel: +234-8058015
Fax +234-62-243
Email: skypowerexpress@yahoo.com
Jojiab32aol.com

AIRCRAFT MASS AND BALANCE REPORT

DATUM OF AIRCRAFT DEFINED AS FOLLOWS: 80 in FWD WLE

AIRCRAFT TYPE	SERIAL NUMBER	REGISTRATION
73 - 250	27 - 4155	5N - BGZ

AIRCRAFT WEIGHED	SPRAY TANK	X
------------------	------------	---

FULL OIL	X
----------	---


UNUSABLE FUEL	
---------------	--

FULL FUEL	
-----------	--

AIRCRAFT WEIGHT@	WEIGHT (LBS)	ARM	MOMENT
NOSE WHEEL	868	24.5	21266
PORT WHEEL	1267.88	114.5	14517.26
STARBOARD WHEEL	1265.9	114.5	144945.55
SUB-TOTAL	3401.78	91.53	311383.81


C.G = $\frac{\text{Total Moment}}{\text{Total Weight}} = \frac{311383.81}{3401.78} = 91.53\text{in}$

NAME: _____

SIGNATURE: 

AUTHORIZATION: 1892

DATE: 06.09.13





5N-BGZ

APPENDIX B3

AIRCRAFT CERTIFICATE OF RELEASE TO SERVICE



SKYPOWER EXPRESS AIRWAYS (NIG) LIMITED

AIRCRAFT CERTIFICATE OF RELEASE TO SERVICE AND MAINTENANCE STATEMENT

AIRCRAFT TYPE: **PIPR AZTEC (PA-23-250)** REG. MARK: **5N-BGZ**

WORK ORDER #/REF: **SEA/MT/ST02**

SCHEDULED MAINTENANCE /INSPECTION CHECK .. **INSTALLATION OF SORENSEN BELLY TANK** .. WAS COMPLETED

AT AIRFRAME (A/C) HOURS **5840** AND **1567** TOTAL LANDING (CYCLES).

LOCATION WHERE CHECK WAS COMPLETED **KADUNA**

It is hereby certified that the work specified above except as otherwise noted, has been carried out in accordance with requirements of Nigerian CAR and the appropriate aircraft Maintenance Programme and in respect to that work, the Aircraft/Equipment is considered ready for "Release to Service".

REMARK (IF ANY) **NIL**

SIGNED: 
(APPROVED CERTIFYING STAFF)

LICENCE NO/STAMP: **1842**
NAME OF THE Nigerian CAR ORGANIZATION: **SKYPOWER EXPRESS AIRWAYS**

DATE: **06-09-13**

NCAA APPROVAL REFERENCE NO: **AMO/5N/SEA/**



The next Schedule Maintenance Inspection is due upon completion by the aircraft of Flying Hours.

The following 'out of phase' Inspections/components changes are due before the next scheduled Maintenance Inspection specified above.

PART NO	S/NO	ITEMS DESCRIPTION	DUE	
			HOURS	DATE

PREPARED BY (NAME) SIGNATURE: 

APPENDIX C

OPSPECS ON AGRICULTURAL AIRCRAFT PA23-250 5N-BGZ



NIGERIAN CIVIL AVIATION AUTHORITY

OPERATIONS SPECIFICATIONS

Annex to the Aerial Work Certificate issued to:

**WEST LINK AIRLINES LIMITED,
FLAT 1 BLOCK 4 GWARAM CLOSE
OFF ABAKALIKI STREET AREA 3
GARKI ABUJA**

Type of Operations
AGRICULTURAL AIRCRAFT

Type of Aircraft and Registration
**Piper Aztec 23
5N BGZ**

Flight rules, special conditions and specifications: **VFR**

Areas of Operations: **Federal Republic of Nigeria**

This Operations Specification is the integral part of the Certificate No:
No. NCAA/AGOPS/09-08/01


Date of issue
March 25, 2014

NIGERIAN CIVIL AVIATION AUTHORITY
Director, Operations and Training

APPENDIX D

AMO OPERATIONS SPECIFICATIONS (OPSPECS)

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NIGERIAN CIVIL AVIATION AUTHORITY
AVIATION HOUSE
P. M. B. 21029, 21038, Ikeja, Lagos, Nigeria

AMO OPERATIONS SPECIFICATIONS (OPSPECS)


NAME OF ORGANISATION: SKYPOWER EXPRESS AIRWAYS LIMITED				
Certificate No. AMO/5N/SEA			Expiry Date: 7TH JANUARY, 2016	
The Certificate Holder is approved in the following Ratings and Limitations				
1. RATINGS AND LIMITATIONS (AMO Part 6.2.1.10)				
Rating		Limitation		
None Authorised				
2. LIMITED RATINGS (AMO Part 6.2.1.11)				
Ratings	Manufacturer	Make/Model	Capability	Limitation
AIRFRAME	EMBRAER S. A	EMB 110 P1/P2 SERIES)		LINE AND BASE MAINTENANCE UP TO AND INCLUDING C-CHECKS
	PIPER AZTEC	PA-23-350 SERIES		LINE AND BASE MAINTENANCE UP TO AND INCLUDING 100HRS/ANNUAL INSPECTION
	CESSNA	C-172 SERIES C-206 SERIES		LINE AND BASE MAINTENANCE UP TO AND INCLUDING 200HRS/ANNUAL INS
	BOEING AIRCRAFT COMPANY	B737-300 B727-200		LINE MAINTENANCE ONLY LINE MAINTENANCE UP TO AND INCLUDING A-CHECKS
3. SPECIALISED SERVICE (RATINGS (AMO Part 6.2.1.11c)				
Rating		Specifications		Limitations
None Authorised				
LOCATION: KADUNA INTERNATIONAL AIRPORT LAGOS GENERAL AVIATION TERMINAL				



5N-BGZ

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AMO Authorised Signature	NCAA Authorised Signature
Date: 20/02/2014	Date: 25/2/2014

The seal of the National Civil Aviation Authority (NCAA) is located in the right-hand signature box. It is a circular seal with a central emblem and the text 'NATIONAL CIVIL AVIATION AUTHORITY' and 'NCAA' around the perimeter.

APPENDIX E

THE INITIAL APPROVAL ISSUED SEA BY NCAA TO INSTALL SORENSEN TANK

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 **NIGERIAN CIVIL AVIATION AUTHORITY**
AVIATION HOUSE
P.M.B. 21029, 21038 IKEJA-LAGC
Tel / Fax: 01-49300


APPROVAL NOTE NO: NCAA/DAWS/AD.1098/Vol.1/66
APPLICANT: SkyPower Express Airways
30th April, 2007
AIRCRAFT TYPE: PIPERAZTEC PA-23

The Managing Director
SkyPower Express Airways,
Kaduna Airport,
Kaduna.


**RE: APPROVAL OF ATTACHMENT OF THE SORENSEN TANK ON YOUR
PIPERAZTEC (PA-23) AIRCRAFT S/N. 274155 REG. MARK 5N - BGZ**

Your letter on the above subject matter dated 4th January, 2007 refers.

Please find attached the Approval Note reference NCAA/AD.1098/
T/BGZ/001 in respect of this modification.


FOR: DIRECTOR GENERAL/CEO.

SECOND APPROVAL ISSUED BY NCAA TO SEA TO INSTALL SORENSEN TANK



NIGERIAN CIVIL AVIATION AUTHORITY
P.M.B. 21029, 21038, IKEJA-LAGOS.

Ref. No: NCAA/DAWS/AD.1098/VOL.IV/003
Date: 16th December, 2013.

The Accountable Manager,
Westlink Airlines,
Flat 1, Block 4, Gwaram Close,
Off Abakaliki Street,
Area 3, Garki Abuja.

Attention: GM, Quality Department

**RE: APPROVAL FOR APPLICATION FOR MINOR MODIFICATION ON
PIPER AZTEC (PA-23) REG MARKS 5N-BGZ; S/N 27-4155**

Your letter dated 22nd October, 2013 on the above subject matter refers, please.

This is to inform you that there is already a subsisting approval granted to this aircraft since 2007.

You are therefore advised to go ahead with the modification.

Be guided accordingly, please.

**GM (Airworthiness Standards and Approval)
For: Director General**