AIRCRAFT ACCIDENT REPORT

NCAT/2008/10/06/F

Accident Investigation Bureau

Report on the serious incident involving a Tampico TB 9 Aircraft belonging to NCAT, registration 5N-CBC which occurred at Zaria Aerodrome, Kaduna State on the 6th of October, 2008

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.

Printed in Nigeria for the Accident Investigation Bureau (AIB)

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GLOSSARY OF ABBREVIATIONS USED IN THIS REPORT

AIB	Accident Investigation Bureau
AIP	Aeronautical Information Publication
AMO	Approved Maintenance Organization
AOL	All Operators' Letters
EFATO	Engine Failure After Take-Off
FMD	Flight Maintenance Department
FTE	Flight Training Department
MAY DAY	Code Used By Pilots to Declare Emergency
MEL	Minimum Equipment List
MMMEL	Master Minimum Equipment List
MOE	Maintenance Organization Exposition
NAMA	Nigeria Airspace Management Agency
NCAA	Nigerian Civil Aviation Authority
NCAR	Nigerian Civil Aviation Regulation
NCAT	Nigerian College Of Aviation Technology
NDB	Non Directional Beacon
NIMET	Nigerian Meteorological Agency
NM	Nautical Miles
QNH	Altimeter Setting That Causes Altimeter To Indicate Altitude Above Sea Level
SB	Service Bulletin

SOP	Standard Operating Procedure
UTC	Universal Time Coordinated
VP2A	Manufacturer's Code for 50 hrs Inspection A=25 HRS

LIST OF FIGURES

Aircraft Accident Report No:	NCAT/2008/10/06/F
Registered Owner and Operator:	Nigerian College of Aviation Technology (NCAT)
Aircraft Type and Model:	Tampico TB 9
Registration Number:	5N-CBC
Location:	Zaria Aerodrome
Date and Time:	6th October, 2008 at 1342hrs *All times in this report are local time (equivalent to UTC+1) unless otherwise stated.*

SYNOPSIS:

The Accident Investigation Bureau (AIB) received notification of the serious incident on the same day from the Nigerian Civil Aviation Authority (NCAA). Investigation into the circumstances surrounding this occurrence commenced the following day. All relevant stakeholders were notified.

At 1335hrs, the student pilot was cleared for departure for a second solo flight by the Control Tower. The take-off was normal and he continued with the upwind, crosswind, downwind and the final legs. On final approach, he had good attitude and airspeed control. The aircraft touched down around the first intersection about 600m from the runway 24 threshold, skidded, and veered off the centre line of the runway to the right.

The aircraft travelled a further 200m from touchdown point before coming to a final stop by a ditch at approximately 31.6m from the edge of the runway. The student pilot disembarked without any injury but the aircraft was substantially damaged.

The investigation identified the following causal and contributory factors:

Causal Factor:

The inability of the student pilot to maintain directional control of the aircraft after touchdown.

Contributory Factors:

i. The student pilot lost concentration while retracting the flap and trimming the aircraft during the landing roll preparatory to the next take-off.
ii. The student was fatigued as he had done six landings with the instructor and four solo landings.
iii. The increased workload due to the "un-gated" flap control knob assembly.

Three Safety Recommendations were made.

1.0 FACTUAL INFORMATION

1.1 History of the Flight

The student pilot reported for flight training at 0750hrs, checked his schedule and was briefed by his Flying Instructor on the next training exercise which was 180° glide approaches and landings with a Tampico TB 9 aircraft, registration number 5N-CBC. At about 1200hrs, 5N-CBC was airborne from runway 24 with the student pilot and his instructor for the exercise.

The training lasted about 50 minutes after satisfactorily performing six landings.

At about 1258hrs, the instructor pilot cleared the student to proceed on consolidated solo on the same 180° glide approaches and landings. The student pilot then performed three additional landings that terminated at 1311hrs.

While the student pilot was performing the three 180° glide approaches and landings, the Instructor was not in the Control Tower to observe the student performance on all the three landings, but he only observed one. As a result, he asked the student to return to the aircraft and carry out two more landings of the same exercise for him to observe.

The student pilot thereafter took off in the aircraft at about 1335hrs for the exercise. The take-off was normal with a good climb out while making a climbing turn to downwind position. On the approach, he had good attitude control and airspeed. The aircraft touched down around the first intersection 600m from the threshold of runway 24 but veered off to the right of the runway centre line, travelled a further 200m from touchdown point, hitting a ditch at approximately 31.6m from the edge of the runway, and coming to a final stop at about 1341hrs.

1.2 Injuries to Persons

Injuries	Crew	Passenger	Other
Fatal	Nil	Nil	Nil
Serious	Nil	Nil	Nil
Minor/None	1	Nil	Nil

1.3 Damage to Aircraft

The aircraft was substantially damaged.

Figure 1: Picture showing the position of the aircraft at final stop (Ditch)

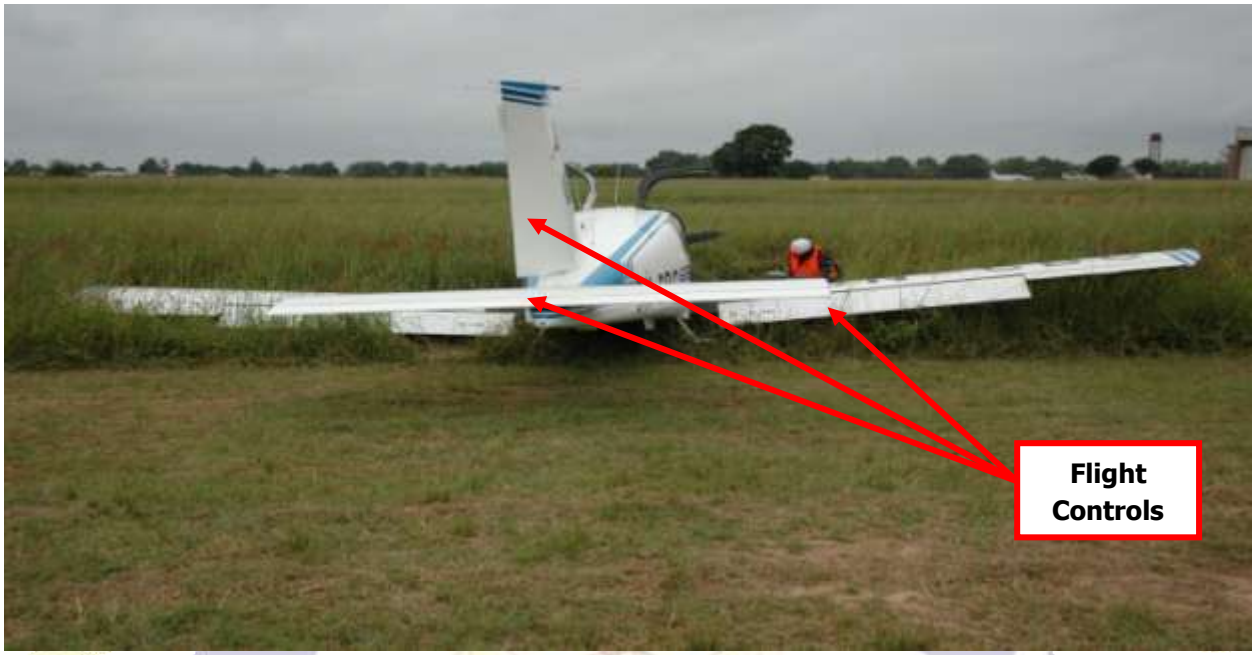


Figure 2: Rear view of the aircraft showing the position of the flight controls

Figure 3: Nose dome area of the aircraft showing damage to propeller blade

Figure 4: Picture showing damaged nose wheel landing gear

1.4 Other Damage

None.

1.5 Personnel Information

1.5.1 Flying Instructor:

Age:	40 yrs
Gender:	Male
Nationality:	Nigerian
Licence No.:	ATPL 3988
Licence Validity:	31st December, 2008
Aircraft Rating:	Tampico TB 9, Baron 58

Total Flying Experience:	2200hrs
Hours on Type:	1200hrs
Proficiency Check:	30th May, 2008
Medical Validity:	30th December, 2008
Simulator Validity:	31st December, 2008
Last 90 days:	09:41hrs
Last 28 days:	08:51hrs
Last 24 hours:	03:14hrs

1.5.2 The Student Pilot

Age:	31 yrs
Gender:	Male
Nationality:	Nigerian
License No.:	SPL 5080
License Validity:	30th May, 2010
Aircraft Rating:	N/A
Medical Validity:	12th May, 2010
Total Flying Experience:	50:40hrs
On Type:	50:40hrs
Last 90 days:	30:55hrs
Last 28 days:	13:20hrs
Last 24 Hrs:	01:50hrs

The Student Pilot was admitted into the College for Private Pilot Licence (PPL) course on 17th March, 2008, commencing with PPL ground studies. He has an HND Certificate in Business Administration.

1.5.3 Aircraft Maintenance Engineer

Age:	46 yrs
Gender:	Male
Nationality:	Nigerian
Licence No.:	2232
Licence/Ratings:	CAT "A" & "C" TB-9, TB 20

1.6 Aircraft Information

1.6.1 General Information

Type:	Tampico TB 9
Serial No.:	1847
Manufacturer:	EAD Socata
Date of Manufacture:	1998
Airframe time:	316:41 hrs
C of A Validity:	26th August, 2009

Engine

Type:	Avco Lycoming 0-320-D2A
Manufacturer:	Lycoming USA
Model:	0-320-D2A

Serial No.:	L-17991-39A
TSN:	316:31hrs
TSO:	09:31hrs
Date of Manufacture:	1993

1.6.2 Snag rectification (Spongy brakes)

On 2nd October, 2008 an entry was made on the Tech Log by a Flying Instructor about the brakes being spongy. The rectification action carried out was that the brakes were tested and found okay.

1.7 Meteorological Information

Wind:	Calm
Visibility:	20km
Temperature:	31°C
QNH:	1012hPa
Cloud:	SCT 450m

1.8 Aids to Navigation

The Non Directional Beacon (NDB) was serviceable at the time of the occurrence.

1.9 Communications

The communication between the aircraft and the Control Tower throughout the duration of the flight was effective.

1.10 Aerodrome Information

The aerodrome is situated to the south of Zaria – Sokoto road and north of Kufena hills. It is a controlled airfield limited to daylight operation (VFR) only due to lack of runway lights on the available paved runway 06/24. The runway is 151ft (46m) wide and 5400ft (1646m) long. See AIP charts below.

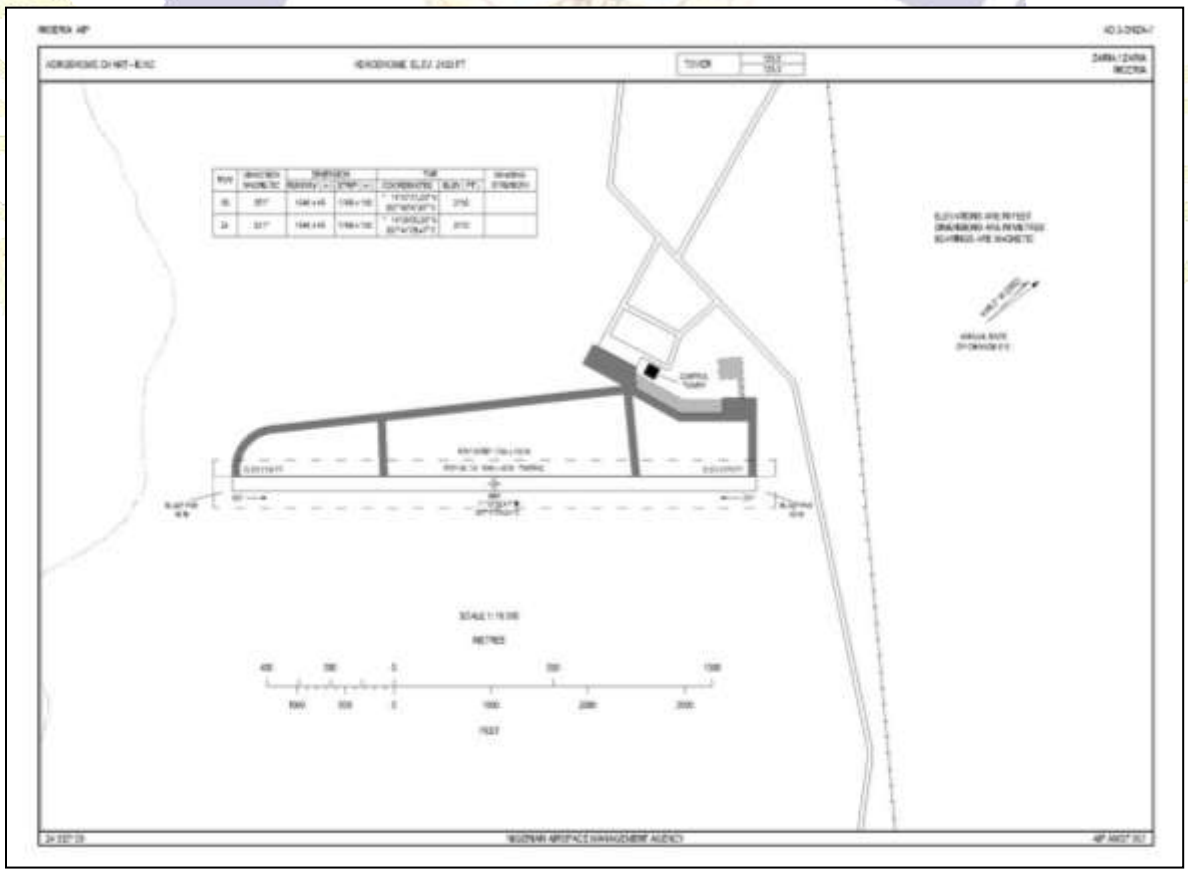


Figure 5: Zaria Aerodrome Information chart

1.10.1 Airport Emergency Plan

Zaria Aerodrome does not have an approved airport emergency plan as at the time of the occurrence.

1.11 Flight recorders

Not Applicable.

1.12 Wreckage and Impact information

The aircraft touched down around the first intersection, and veered off the runway centre line and stopped by the ditch. The aircraft sustained substantial structural damage to its propeller, starboard wing and the nose landing gear.

1.12.1 Cockpit Instrument and Control Readings

Examination of the cockpit controls revealed the following:

Throttle:	Forward
Mixture:	Full rich
Cab-Heat:	Off
Flaps:	Down
Fuel Selector:	Off Position

1.13 Medical and Pathological Information

The student pilot reported to the NCAT Aero Medical centre where he was examined. The result of the examination revealed that he was well oriented to time, person and space; his blood pressure was normal, while his chest, abdomen and extremities appeared normal. However, breath alcohol and substance abuse test was not carried out.

1.14 Fire

There was no fire outbreak.

1.15 Survival Aspects

The occurrence was survivable because there was a liveable volume available where the student pilot was. Since the event occurred within the vicinity of the airport, the Tower controller adopted full phases of emergency procedure and the student was rescued alive and taken to NCAT Aero Medical centre.

1.16 Test and Research

Nil.

1.17 Organisational and Management Information

1.17.1 Nigerian College of Aviation Technology (NCAT) Zaria

NCAT Zaria is an NCAA Approved Training Organisation (ATO) charged with the responsibilities of providing approved course of training for Commercial Pilot Licence

(CPL), Instrument and Multi-engine ratings in addition to other courses. The NCAT career path for each category of staff is as shown in Appendix A.

1.18 Additional Information

Nil.

1.19 Useful or Effective Investigation Techniques

Nil.

2.0 ANALYSIS

2.1 Flap Selection and Gating in TB 9 aircraft

A flap is essentially used for augmentation of lift during take-off, and also during landing to slow down the aircraft.

The NCAT TB 9 checklist requires flaps to be set to take-off position by pressing on the flap knob, then cross checking it by looking at the movement of the flap indicator on the pedestal and also checking outside to see the position of the flaps. This process is cumbersome since the flap positions are not gated. This increases the workload and causes distractions for the student pilots.

The NCAT TB 9 Ops manual recommends that for touch-and-go exercise during final approach, the procedure is:

- Set maximum flap position
- Airspeed to 70KTS
- Trim
- Inform the ATC

For take-off, the procedure is:

- Set flap to take-off position
- Trim
- Throttle to full power
- Airspeed to 65KTS
- Rotate

It was when the student touched down and in the process of retracting the flaps/pitch trim back to take-off position that the aircraft veered off the centreline of runway 24 and stopped by a ditch.

On landing, the procedure is:

- Flaring over the runway threshold.
- Set idle Power over the threshold.
- Allow aircraft to bleed off speed.

On Touch Down, the procedure is:

- Retract Flaps to take-off position.
- Trim the aircraft.
- Add full power smoothly and rotate.

On visual inspection of the aircraft flap control knob assembly, it was discovered that the flap selector was not "gated". Gating the flap selector would have reduced workload on the student pilot and enhance safety.

2.2 Conduct of the Consolidated Solo Flight

At 1335hrs, the student pilot was cleared for departure for second solo flight by the Control Tower. The take-off was normal and continued with the upwind, crosswind, downwind, base, and final legs. The aircraft touched down around the first intersection at about 600m and travelled further 200m before it veered off to the right of the runway centreline. The student pilot was on a consolidated solo exercise of 180^{o} glide approach and landing earlier performed with his instructor. Before the commencement of this second solo flight, he had earlier performed six landings which lasted for 50mins. During the student pilot solo flight, he performed an additional three 180^{o} glide

approach and landings. However, since the instructor was not present to observe these landings, he authorized the trainee pilot to perform two more landings so that he can observe the flight.

According to the instructor, the student's take-off was normal with a good climb-out, while making a climbing turn to downwind leg through to final. On final approach, he had good attitude control and airspeed and touched down around the first intersection, then veered off the runway centre line in the process of retracting the flap and trimming the aircraft for the second take-off. The incident occurred on the 10th landing.

3.0 CONCLUSIONS

3.1 Findings

1. The Flap selector is un-gated.
2. The Standard Operating Procedure of the Flying School which was presented to the Bureau does not have an approval page and relevant signatures as at the time of the occurrence.
3. The Flying Instructor was not in the Control Tower during the first two solo flights.
4. The training exercise was on 180^{o} glide approach and landing.
5. The student pilot had performed six touch-and-go training exercise with his instructor, after which he was instructed to do an additional three solo touch-and-go exercise.
6. NCAT does not have the facility to carry out toxicological test for alcohol/substance abuse.
7. The incident occurred on the 10^{th} landing of the touch-and-go exercise.

The investigation identified the following causal and contributory factors:

3.2 Causal Factor:

The inability of the student pilot to maintain directional control of the aircraft after touchdown.

3.3 Contributory Factors:

i. The student pilot lost concentration while retracting the flap and trimming the aircraft during the landing roll preparatory to the next take-off.

ii. The student was fatigued as he had done six landings with the instructor and four solo landings.

iii. The increased workload due to the "un-gated" flap control knob assembly.

4.0 SAFETY RECOMMENDATIONS

4.1 Safety Recommendation 2014-011

BEA (Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile) should propose to the Aircraft Manufacturer - SOCATA of France to incorporate a "gate detent" position in the flap control knob assembly. This will make proper flap selections easier during aircraft operations.

4.2 Safety Recommendation 2014-012

NCAT should ensure that Flying Instructors checking out students on solo flight must at all times be at the Control Tower to monitor the progress of the flight.

4.3 Safety Recommendation 2014-013

NCAT should procure equipment and train relevant personnel to conduct toxicological examination in its Aero Medical facility.

RESPONSES TO SAFETY RECOMMENDATIONS

NCAA Responses to AIB Safety Recommendations

NCAA accepts Safety Recommendation 4.1 (2014-011)

"The NCAA agrees with this recommendation and would ensure compliance of the aircraft type in the Nigerian Registry to incorporate a 'gate and detent' position in the flap control knob assembly, when the Type Certificate Holder/Manufacturer (SOCATA) issues a Service Bulletin or the State of Design issues an Airworthiness Directive with respect to this subject matter."

NCAA partially accepts Safety Recommendation 4.2 (2014-012)

"a. The NCAA is currently reviewing the amendments to NCAT's Flying School Procedures Manual (NCAT/FSPM/001), Issue 001, June 2012 and has required that the College develops and incorporates into sections 1.5.3 and 1.5.4...."

"b. The 180^{o} Glide approaches and landing is an advanced maneuver and does not require the flying instructor's presence at the Control Tower;"

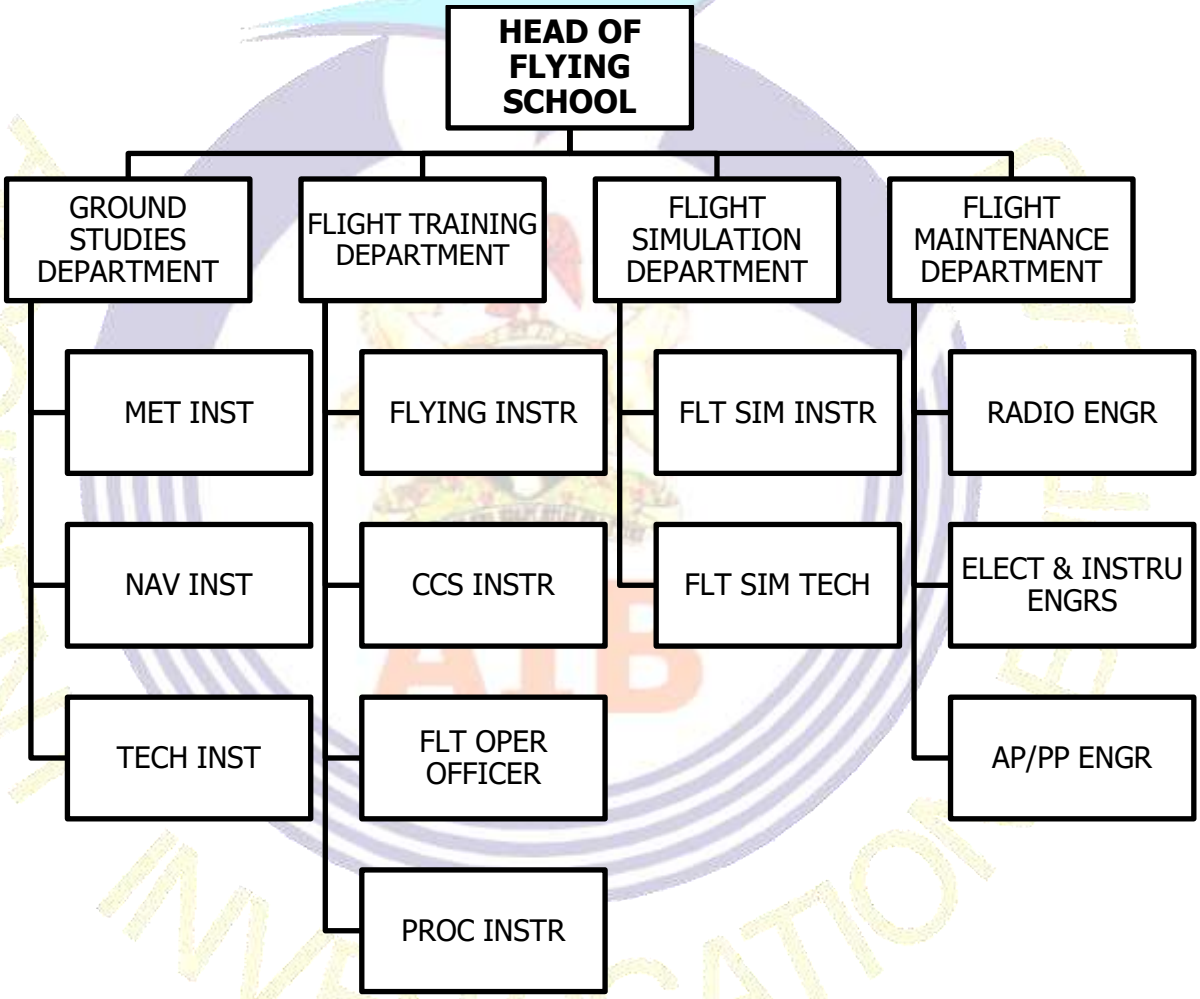
NCAA accepts Safety Recommendation 4.3 (2014-013)

"Within the scope of the accomplishment of its safety oversight obligations, the Authority has established that NCAT has procured Breathalyzer, Cup and Strip Equipment and has trained its personnel on the utilization of these equipment for Toxicological screening test..."

APPENDIX

NIGERIAN COLLEGE OF AVIATION TECHNOLOGY, ZARIA

CAREER PATH FOR EACH CATEGORY OF STAFF IN FLYING SCHOOL



CHIEF FLYING INSTRUCTOR/HEAD OF FLYING SCHOOL

Duties

The Head of Flying School is responsible for the day to day administration of the Flying School. He/She has responsibility for ensuring quality and safety in all activities of the School and is a member of the management review meeting.

The position carries the following responsibilities:

- *Organizing and coordination of all training activities/examination in the flying school.*
- *Coordinating and supervising the updating of syllabus of courses in the school.*
- *Conducting proficiency/quality control checks on both Instructors & Students from time to time to monitor the training standards.*
- *Preparing the budget and statement of expected expenditure of the school for the year.*
- *Preparing annual report on activities of the school.*
- *Maintaining accurate training records of staff and students in the school.*
- *Establishing and maintaining liaison between all the departments/units in the school with other schools and service departments.*
- *Taking full responsibility for proper maintenance and control of the stores in the school.*

- *Supervising and coordinating the proper use of training aids, materials, laboratories, workshops and classrooms in the school.*

- *Maintaining liaison with the Deputy Rector & Registrar on all matters affecting training and personnel respectively.*

- *Performing instructional duties and any duties that may from time to time be assigned to the Head of School.*

- *Drawing up course for the training development and recurrency of instructors in the school.*

- *Coordinating with NCAA via the Chief Executive for all matters affecting the school and NCAA.*

- *Representing proposals, advices and inputs to the Chief Executive for the effective, safe and efficient running of the school.*

- *Representing the school in any function.*

- *Carries out Administrative ferry and test flight.*

- *Any other duty that might be assigned from time to time.*

HEAD OF FLIGHT TRAINING DEPARTMENT

- *Accountable to the Head of School.*
- *Coordinates flight programmes and training in flight training department.*
- *Takes responsibility for all the activities in the department.*
- *Ensures the effective running of flight training department.*
- *Involves in interviews with SP-Course.*
- *Keeps accurate record of staff, student and course running in the department.*
- *Represents the HOS when necessary.*
- *Is involved in the training of student pilots.*
- *Any assignment that will be delegated from time to time.*
- *Responsible for drawing out budget and training proposal for the Department.*

COURSE MASTER (COURSE COORDINATOR)

- *Accountable to Head of Department.*
- *Draw out daily flight programme for the course*

- *Sees to the daily needs of students in his course.*

- *1st contact of the student courses with the Ground School via the Head of Department and Head of School for the training of SP-Course.*

- *Write weekly report of student programme and progress.*

- *Reports to the Head of School via Head of Department concerning all the training matters of students.*

- *Liaise with the NCAA via CEO, Head of School, Head of Department concerning matters affecting student training.*

- *Ensures smooth and regular training of students.*

- *Keeps accurate record of students' programmes, performance and progress.*

- *Directly responsible for discipline, standards and welfare officers' safety.*

- *Any assignment that will be delegated.*

- *Be involved in the training of students.*

- *Report erring students to the Head of Department.*