



FEDERAL REPUBLIC OF NIGERIA

*FEDERAL MINISTRY OF CIVIL AVIATION  
LAGOS-NIGERIA*

*AIRCRAFT ACCIDENT REPORT*

*CIVIL AIRCRAFT ACCIDENT REPORT NO. CIA 129 ON  
AIRBUS A-310  
AT PORT-HARCOURT AIRPORT  
PORT-HARCOURT*

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FEDERAL MINISTRY OF AVIATION  
AIR REGISTRATION BRANCH  
21029

AIRSAFETY, LAGOS

16th February, 1988.

The Hon. Minister of Aviation,  
Federal Ministry of Aviation,  
Joseph Street,  
Lagos.

Dear sir,

**Civil Aircraft Accident Report No. CIA 129**

I have the honour to submit the report by Mr. Remi Faminu, Principal Inspector of Accidents, on the circumstances of the accident to the Airbus A-310 registered 5N-AUG which occurred at Port-Harcourt International Airport on the 8th of September, 1987.

Yours faithfully

K. K. O. SAGOE

Chief Inspector of Accidents



### Aircraft Data

<b>Types</b>	Airbus A-310 - 221
Registration:	5N-AUG
Serial No.	329
Manufacturer:	Airbus Industrie Avenue Lucien Servanty B.P. No. 33 31700 Blagnac - France.
Owner:	Nigeria Airways Ltd., Airways House, Murtala Mohammed Airport, Ikeja
Operator:	Owner operated as flight WT 104
Crew:	(1) Capt. John Idoko (2) F/O Ayo Garuba
No. of Passengers:	99
No. of Cabin Crew:	8 - stewards 3 stresses 5
Location of Accident:	Vicinity of the threshold area of runway 21 at Port-Harcourt Airport.
Date and Time:	8th of September, 1987 at 1756 Hrs. UTC.



## Synopsis

This mishap involves Airbus A-310 model 221, serial numbered 329 with registration mark of 5N-AUG. It was operated by Nigeria Airways Limited as flight WT 104 and crashed in the landing phase on September 8th, 1987 at approximately 1756 hours UTC at Port-Harcourt International Airport, Rivers State.

Earlier on that day, the aircraft had operated five flights in and out of Port-Harcourt International Airport; the last three flights were made by the accident crew. The sixth one was the unfortunate incident and no technical problem had been indicated in the log books, which could be a contributory factor to the accident.

Throughout the approach and landing phases it was raining. The approach profile became unstabilized at about 45 seconds before touchdown, the landing was made off the runway centreline and the aircraft over-ran onto an unsafe shoulder. The decision to continue the approach despite the unstable approach profile was deemed a bad judgement.

### Factual Information

#### History of Flight:

The flight originated from Lagos as WT 104. It departed at 1717 hours UTC and was expected to land at Port-Harcourt, its destination, at 1756 hours. Port-Harcourt Air Traffic Control was in contact at the cruising altitude of 29000ft. and the 1700z weather was passed to the aircraft. Visibility was given as 3000 metres, Wind - from 200 degrees at 13 knots and slight rain.

The 1730 special weather report was passed to the pilot at about 1740 hours as improved visibility of 6km and the Commander opted to come overhead the station and observe things for himself. The Controller later cleared flight WT 104 to sector altitude (2000ft) and field-in-sight was announced by the Captain.

On long final, the descent was visual and manual. Since the wind was not strong, the Captain did not pay attention to its direction but was only preoccupied with avoiding the clouds. The aircraft crossed the threshold at about 50ft high while the Captain claimed to be taking visual perspective to left of the runway's centreline.

The right main gear touched down first and rolled for about 180metres before the left gear touched down about 2.4 metres to the runway's left edge. The nose gear touched down at about 4.9 metres to the edge but the aircraft's azimuth was in the direction still to the left, the runaway. On the nose gear's touchdown, this direction and heading were maintained; sooner the aircraft ran off and snapped the surface laid electrical cables.

1.2 **Injuries to Persons:**

Injuries	Crew	Passengers	Others
Fatal	-	-	-
Serious	2	-	
Minor/None	-	6/93	-

1.3 Damage to aircraft:

The aircraft was substantially damaged. Nose gear was sheared off and the left hand main gear was severed from the attachment point to the structures. Number one engine was totally destroyed while number two engine had minor\_ visual damages. The fuselage had a large hole aft of left hand main plane.

Owing to severity of impact transmitted to the left wing and to the structure's, cross beams by the broken strut it is probate that the primary structural members are badly damaged

1.4 Other Damages:

Some of the runway edge lights were knocked off. One or two runway light transformers were damaged. A couple of surface-laid electrical cables which were run along the very edge of paved runway were severed or badly twisted by aircraft tyres resulted in tripping the electrical Isolator Circuit breaker E1 in the Power house.

1.5 Personnel Information:

1.5.1	Commander	-	Male
	Age	-	41 years
	Licence	-	Airline Transport Pilot
	Number	-	ATPL 1243
	Validity	-	Up to 30th September, 1987
	Medical	-	Valid till 30th Sept., 1987
	Instruments	-	Valid till 3004 Sept., 1987



**Flying Experience**

Total time - 7979 hours  
Total on type - 1618 hours  
Time converted to type - 19th February, 1985

**Aircraft ratings:**

Part I - DC-10  
- Boeing - 737  
- Airbus A-310  
Part II - Fokker F-27  
- Fokker F-28  
- Gulfstream II

The Commander had a total duty rest period of 18 hours before resuming on the day of accident.

1.5.2 First Officer - Male  
Age - 34 years  
Licence - Commercial Pilot Licence  
Number - CPL 2811  
Validity - 20th November, 1987  
Medical Validity - 20th November, 1987  
Instrument validity - 2nd December, 1987

**Flying Experience:**

Total time - 4021 hours  
Total on type - 513 hours  
Aircraft ratings:  
Part I - NIL  
Part 11 - Boeing 737  
- Airbus A-310

The First Officer had a resting period of 18 hours on that day. before assuming duty

1. 5. 3 Air Traffic Controller	Male
Age	32
Licence	Aerodrome and Approach
Licence No.	126
Validity	Expiring Dec., 1987
1:6 Aircraft Information:	
1-6:1 Leading Particulars:	
Constructor	Airbus Industrie, Avenue Lucien Servanty, B.P. No. 33, 31700 Blagnac, France.
Type	A-310 series 221
Serial No.	329
Date of Construction	November 1984
Certificate of Registration	No. 619
Registration Mark	5N-AUG
Certificate of Airworthiness	- valid till 16th January, 1988
Category	Transport (Passengers)
Owner/Operator	Nigeria Airways Limited
Total Airframe time	5408 hours
Engines	2 Pratt & Whitney Fanjet
Engine type	JT 913 - 7134131
Serial No.	No. 1 - P.707733 destroyed No, 2 - P.707726 Serviceable

1.6.2 The aircraft came out of last major check (check 2C) on January 13th, 1987 at the airframe time of 4450 hours. At the time of that check all required modifications were embodied before the certificate of airworthiness was renewed on January 16th 1987.

1.6.3 The technical log book entry before the last flight was that "yaw damper" No. 2 trips on take-off and approach. The accident Captain was aware and the minimum equipment list permits flight with one out of the two dampers inoperative. The inoperative yaw damper will not hazardeously affect flights and it is not a contributory factor to this accident.

1.6.4 Weight and Balance:

The maximum designed take-off weight of the aircraft is 138-600kg and maximum landing weight is 121,500kg. Flight WT 104 departed Lagos with the weight of 112613kg and the calculated landing weight was 108613kg. The load and Trim sheet for A-310 was checked against the aircraft loading and the center of gravity was found to fall within the prescribed limits.

1.7 Meteorological Information

1.7.-1 Initial contact was made with the aircraft at 1732 hours UTC at flight level 290 and 1700hrs. UTC weather report was passed to the crew:

Visibility	- 5000 metres
Wind	- from 200 degrees at 13 knots
Cloud	- 5 Oktas SC at 180M. - 2 Oktas CB at 660M - 8 Oktas AS at 3000M
Weather	- Thunderstorm
QNH	- 1009 MBS
QFE	- 1005 MBS

Special weather report for 1730Z was passed to the aircraft at 1740 hours UTC:

Visibility	- 6 kilometres
Wind	- from 200 degrees at 12 knots

Cloud	- 6 Oktas SC at 180M
	- 2 Oktas CB at 660M
Weather	- Thunderstorm
Temperature	- 24 degrees Celsius
Dew Point	- 23 degrees Celsius
QNH	- 1009 MBS
QFE	- 1005 MBS

There was rain throughout the descent but became heavier, which made the Commander to call for 'faster wiper' just before the Auto-Call-out, indicating that there was reduced visibility in a twilight rain condition.

**1.7.2** Natural light condition at the time of accident was twilight worsened by the pouring rain. It would be a bit difficult to see properly after coming through the clouds and rain.

### **1.8 Aids to Navigation**

Followings are the condition of navigational aids available at Port-Harcourt Airport at the time of accident:

Radar	- Shut down
VOR 'PT'	- Unserviceable (U/S)
DME 'PT'	- U/S
Locator 'PR'	- U/S
ILS/Localizer	- Serviceable
Glide Slope	- U/S
Mid-Marker	- Serviceable
ILS/DME	- Serviceable
N D B ' PH'	- Serviceable
VASIS	- Serviceable
App Lights	- Serviceable

Touchdown Zone lights.

Runway- 21 lights:	-	Serviceable
Runway 03 lights: _	-	U/S
Runway centreline	-	U/S
Runway edge	-	Serviceable (until after T/D when a section of the lights went off)

### **1.9 Communications:**

The radio communications between the ground and the aircraft were perfect but the ATC tower automatic tape recorder was unserviceable .and had been unserviceable for the past 17 months. The Cockpit Voice Recorder has inherent problem of unclear recordings. The fire vehicles on standby at the runway were not fitted with radio communications, which made it impossible for tower to reach emergency vehicles. No telephone contact between tower and the Chief of facility's home.

No telephone contact between airport and Me city's emergency services. ATC had no contact with Lagos on SSB radio.

### **1.10 Aerodrome Information:**

**1.10.1** Port-Harcourt's runway 21/03 has a width of 60 metres with painted centreline markings and unserviceable centreline lights. There are runway edge lights at intervals of 60 metres on each side of the runway throughout its 3000 metre length.

**1.10.2** These runway edge lights are powered by two different electrical circuits identified E1 and E2- Circuit E1 powers alternate edge lamps throughout the runway length, while E2 powers the other adjacent lamps in alternate successions.

The advantage of this wiring technique is that, if either of the circuits fails, at least, half of the lamps will be illuminated alternately throughout the entire length and on both sides of the runway.

**1.10.3** The electrical cables of these edge lights, approach lights and VASI lights are laid on the surface at the very edge of the paved runway and they are, therefore, exposed to accidental cuts and bruises.

**1.10.4** There are open wide and deep trenches very close to the left side of runway 21 - These trenches are about one metre from the edge of the runway, on the immediate shoulder. They are about one metre deep and half a metre wide (see plate No. 1) from the beginning of runway 21 and continuing towards the beginning of runway 03

**1.10.5** There is a rapid exit taxiway adjoining to the runway at about 900 metres from the beginning of runway 21

**1.11 Flight Recorders:**

The aircraft was equipped with Sunstrand; Digital Flight Data Recorder type 980- 4100, serial number 2066 which was installed in December 1984. The reproduction of recorded information was excellent and accurate.

The Cockpit Voice Recorder was Fairchild 93A100-30, serial, number 15437 installed on the aircraft on 22nd of May 1987. The voice replay was inaudible and poor.

**1.12 Wreckage and impact Information:**

The trench alongside runway 21 did the most devastating impacts to the aircraft. The accident became more disastrous when the Left main gear first ran into the ditch and fractured the strut. The nose gear also broke off. Port side engine impacted with the ground, crushing the fan-blade shroud and eventually the High Pressure compressor chamber.

Engine number one suffered an irreparable damage. The airplane came to rest 640 metres after initial touchdown, with its left wing in contact with ground because the left gear had been completely severed off earlier in the disastrous landing roll. (Please see attached plate Nos. 2- 5)

Along the wreckage trail, (appendix 1) are engine intake cowl, fan blades, compressor blades, thrust reverser parts, left main gear struts, wheels and brake assembly, Nose gear wheel assembly, brake line hoses, and engine acoustic linings.

If the trench had not been there, it could just have been a case of an aircraft running off the runway and getting stuck in the mud or better than that.

(Photographs are attached in the appendix).

### **1.13 Medical and Pathological Information:**

There were 109 souls on board.

2 flight-crew members

8 Cabin-crew members

99 Passengers.

The Captain was treated for shock and was hospitalised for some days. The first officer was treated for lacerations, abrasions and conjugal hemorrhage, he too was hospitalised for some days.

Six passengers were hospitalised for more than 24 hours and two were discharged after treatment. Many of the passengers with minor injuries were treated and released the same night.

#### **1.14.1 Fire:**

Owing to the resourcefulness of the firemen on standby, Engine No. 1 was quickly covered with foam agents to suppress any fuel spill combustion or any electrical fire. There was no fire outburst at all.

#### **1.14.2 Fire Service Inadequacies:**

Port-Harcourt International Airport fire service is expected to handle large aeroplanes, yet did not have the necessary and adequate implements to fight the situation if a worse kind of accident happens.

The Chief fire officer testified that his station does not have any ambulance, no Rapid Intervention Vehicle, No Communication receiver/transmitter in any of the service vehicles nor in the watch-room. The strength of officers and ranks at the station is inadequate. The station is supposed to have 120 men on strength but it has only 46, which left only 10 men on a shift where aircraft had 108 souls on board that night of accident. Neither the fire services nor NAA Manager is provided with vehicle maintenance fund and no contingency fund.

These inadequacies may leave officers and men incapacitated in a situation when their service is needed most.

#### **1.15 Survival Aspects:**

This pertinent accident was survivable only because there was no fire outbreak.

The crash impact forces of the accident were within the range of human tolerance.

If there had been fire, there would have been more fire casualties than normal because of the fire service's inadequacies.

1.16 Test and Research:

None.

**2. Analysis:**

- 2.1 The aircraft was landed to the far left of runway's centreline in a direction which is not parallel to the runway's layout.
- 2.2 A perfect landing is accomplished when the nose gear settles down along dead centreline of a runway - giving a couple of feet to either side of the line. But the nose gear of flight WT 104 touched down about 82 feet off the centreline and only 16 feet to the runway edge; it was 84% off centreline.

When the left main-landing gear was on ground, the longitudinal axis of the aircraft was already running out of the edge of the runway. By the moment the nose gear was set near the edge of runway, the maximum right rudder correction application was inadequate to bring the axis back to the runway. Instead, the correction made the two main-gear to skid along the wet runway, while the momentum and force of inertia kept the longitudinal axis out of the runway direction.

The nose gear touched down shortly before the aircraft approached rapid-exit-taxiway intersection with the runway, the wide expanse of which gave the crew, the erroneous impression that the airplane was well in the middle of paved runway. This led the crew to keep this heading, forgetting everything to the right which was the general direction of the runway. Of course, there would be no lights ahead of them because the lights were to the right - the true runway direction. It was not surprising that the crew gave evidence as follows: .....we were seeing the lights then suddenly, we did not see the lights anymore."

- 2.3 The Air Traffic Controller gave evidence that he saw the runway edge lights go off simultaneously with the aircraft's landing lights at the very moment of touchdown. But at the aircraft's rolling speed of about 250 miles per hour, the time elapse between aircraft's breaking of the edge light cables and its running into the trench, which crushed the landing light was but split of a second. Obviously, the timing will look simultaneous to someone in the control tower or farther off. Further, it would be impossible to tell when the aircraft actually touched down in a condition of darkness looking from the control tower.
- 2.4 Setting the aircraft on the runway's edge was consequential to an unstabilised aircraft's approach profile, which began about 60 seconds before touchdown, when the aeroplane was still then at about 450 feet above the ground. From here, there were desperate inputs of the three control surfaces which did not portray any amount of co-ordinated manoeuvres (Appendix 2)



At the minimum decision height (MDH) of 100 feet, that is, 10 seconds before touch down, the airplane was still capable of executing a GOAROUND, but the crew mis-judged by holding to the decision to touch down. This is bad judgement and a wrong decision to continue with the approach. [Please see appendix No. 2 for the extent of the control surface movements for about 42 seconds before touchdown).

- 2.5 Since the commander was converted to A-310 in February 1985, he ought to have had 3 recycling courses as his proficiency training before the accident, but he had only 2 of such trainings. He was therefore in default of the Regulation 22 and should have not taken flights.

The purpose of recycling training is to help break bad flying habits that might have been cultivated. This commander is a new convert, he had 17 months interval between trainings, and has therefore violated Regulation No. 22- This deficiency might have contributed to his flying technique on that fateful night.

- 2.6 "A runway shoulder should be prepared or constructed so as to be capable, in the event of an aeroplane running off the runway, of supporting the aeroplane without inducing structural damage to the aeroplane." ICAO's "Aerodromes" Annex 14 chapter 3-2-4

Port-Harcourt Airport was constructed to this specification; but the trench, for whatever purpose, has negated the purpose for which the shoulder was constructed. The trench inflicted the most devastating "structural damages" to the aircraft.

If the trench were meant for cable laying, it is surely, too wide, too deep and too close to the runway of that category. Besides, it should have been a quick disposable job, the soil of which should have been replaced and the shoulder's status brought back to its aircraft's weight-bearing specification.

If the trench was for drainage purpose, it should have been a covered culvert constructed to the specification as prescribed by Part 2 of ICAO's "Runway Design".

What we have at Port-Harcourt as a shoulder to runway 21/03 is nothing short of an open trap for aircraft running off its course. It killed the aeroplane.

### 3. Conclusion:

#### 3.1 Findings:

In the course of investigation of this accident, the inspectors found out the following facts:

- 3.1.1 That the airplane had been maintained in accordance with an approved maintenance schedule and had a valid certificate of airworthiness for her operations.

**3.1.2 That Port-Harcourt International Airport was adequate for the category of that aircraft. Though some navigation and landing aids were in-operative.**

**3.1.3 The Air Traffic Controller has the required experience and is properly licensed as per Civil Aviation regulations. He has, precisely and concisely, passed the necessary information to the commander whose prerogative it was to continue or abandon the approach.**

**3.1.4 The ATC tape recorder was unserviceable for about 17 months and was still unserviceable on the day of accident thereby making it impossible to record the communications with flight WT 104 and other flight to and through Port-Harcourt flight circuit.**

**3.1.5 That the trench, dug along runway 03/21 for whatever reason had negated the purpose for which runway shoulder was designed "..... to accommodate any aircraft running off the runway".**

**3.1.6 That the Chief fireman, with his men on the lead vehicle, was on standby before the appearance of the aircraft, was in the clear view of the runway edge lights close to the vehicle but did not observe any of the lights go off before he and his men swung into action.**

**3.1.7 That the Nigerian Airport Authority Electrical Engineer in charge of the airport did not record any discontinuity in national power supply (NEPA) for all of airport precinct except the isolator controlling E1 circuit which tripped off just about the time of the landing, and could not be reset but E2 circuit remained on.**

**3.1.8 The flight crew, though, was found to be properly licensed, was also found to be in default of Part B to schedule 10 of Regulation 22 which says:**

**"Every pilot included in the flight crew, who is intended by the operator to fly as pilot in conditions requiring compliance with Instrument Flight Rules, shall for the purposes of the flight be deemed to have complied with such requirements respectively within the relevant period if he has qualified to perform his duties in accordance therewith on two occasions within the period of twelve months immediately preceding the flight, such occasions being separated by an interval of not less than four months."**

**The operators of the aircraft knew the fact that the pilot had not been sent on proficiency trainings, according to the frequency as prescribed by the Regulation 22 of "Civil Aviation Act" and yet allowed him to be in command of the aircraft. They have defaulted.**

**The airline was then forced to seek concession from the Ministry. This very fact revealed that the airline was not aware of the fact that simulator trainings for a newly converted pilot are not for the purpose of compliance with regulations, but the bed-rock of safety in the subsequent years of operating the aircraft.**

- 3.1.9 That the crew started to have the problem of unstabilized approach from altitude of 460 feet and 44 seconds away from touchdown. The crew had adequate time to make good judgement of the situation and make precise decision.
- 3.1.10 Despite the instability on the last leg of final approach phase, the commander decided to go ahead with the landing and consequently landed the aircraft at the left edge of runway 21 after which any correction was too late.
- 3.1.11 The aircraft, therefore, ran off the runway onto the shoulder. The existence of a trench of such dimensions alongside the runway inflicted most damage to the aircraft.
- 3.1.12 In the process of the aircraft's over-running the runway, the surface laid edge light cables were snapped up, bruised and the short circuit tripped the E1 isolator on the electrical control panel in the power house. The tripping of the isolator would, of course, cut current supply to all the edge lamps that were tied to E1 circuit. E2 circuit remained uninterrupted during and after the accident and NEPA was supplying the power.

### **3.2 Probable Cause:**

- 3.2.1 The probable cause of the accident was the decision of the Commander to continue an unstabilized approach profile to a touchdown instead of initiating a missed approach at 100ft. or more from the ground.
- 3.2.2 The first contributory factor was the touchdown point which was displaced 82ft. left of the centre-line and 2 degrees left of the runway direction.
- 3.2.3 The second contributory factor was the open trench close to the runway shoulder which immediately trapped the left main landing gear in a bid to correct to the runway heading with right rudder.

**4. Safety Recommendations:**

**4.1 It is recommended that:**

The trench at runway 21 should be filled immediately and the surface be brought to the load bearing status which the runway design specifies.

**4.2** The instrument landing system (ILS) at Port-Harcourt and all other navigational aids should be restored and be made serviceable at all times

**4.3** The control tower's automatic tape recorder should be rectified immediately to continue recording communications between ATC and aircraft.

**4.4** There should be a radio link between tower and all emergency vehicles that are deployed to the runway and those used for search and rescue.

**4.5** Telephone link between ATC and the external emergency services is highly recommended because their assistances will be essentially supplementary to the ones available. Such supplementary assistance would be vital in the case of an accident to a wide body aeroplane.

**4.6** The fire service at the airport does not have Rapid Intervention Vehicles, and ambulance.

It is recommended that these essential vehicles should be provided and the strength of staff be increased. Funds for maintaining the fire service vehicle fleet should be provided.

**4.7** Aerodrome Inspectorate Department must be geared to inspect all airports on monthly basis and to point out potential hazards and advise against those hazards which may exist at any airport.

Plate No. 1



*Plate No. 2*



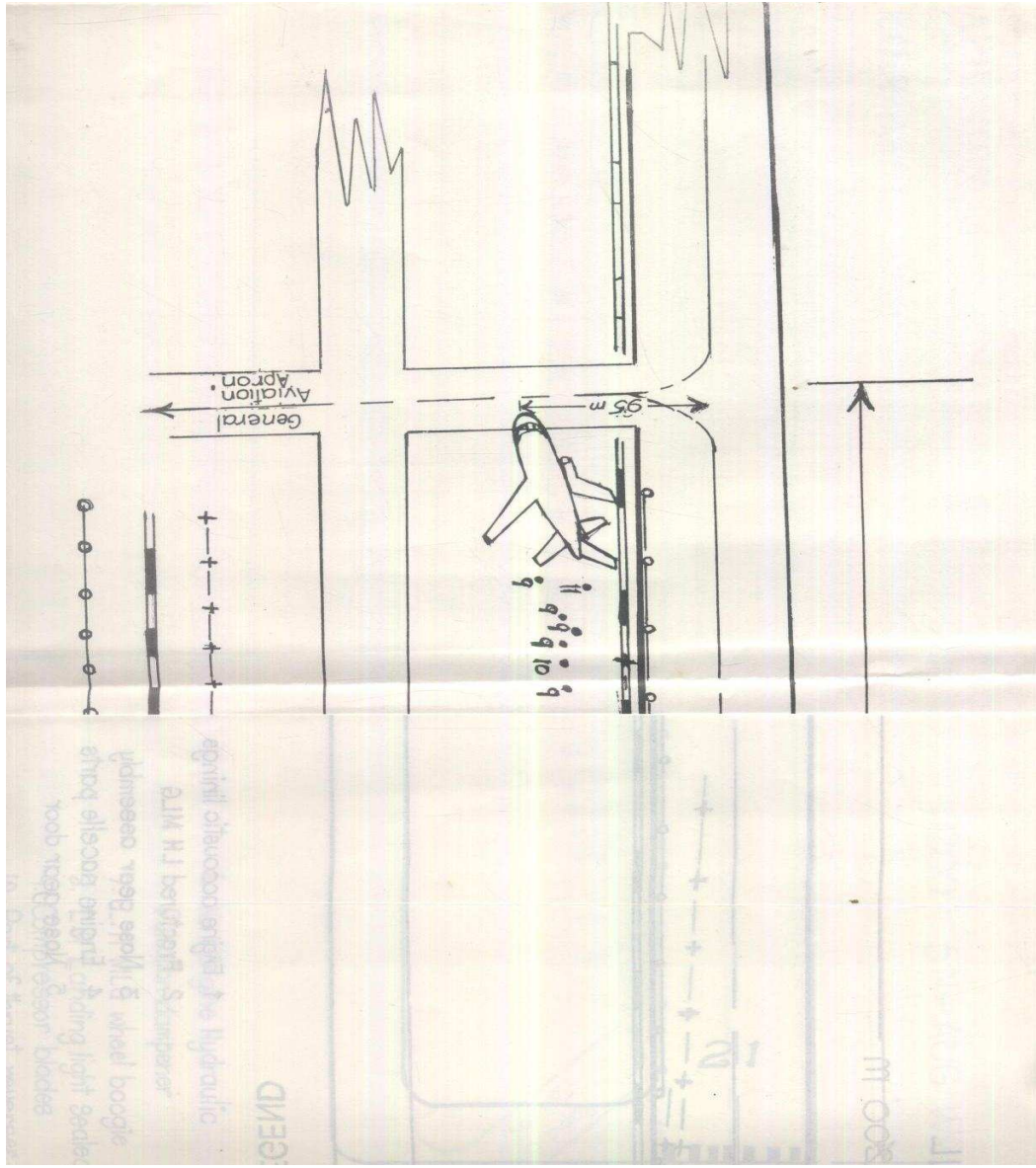
*Fractured left main-landing gear 19*





aircraft at the final resting place showing the crushed portbox

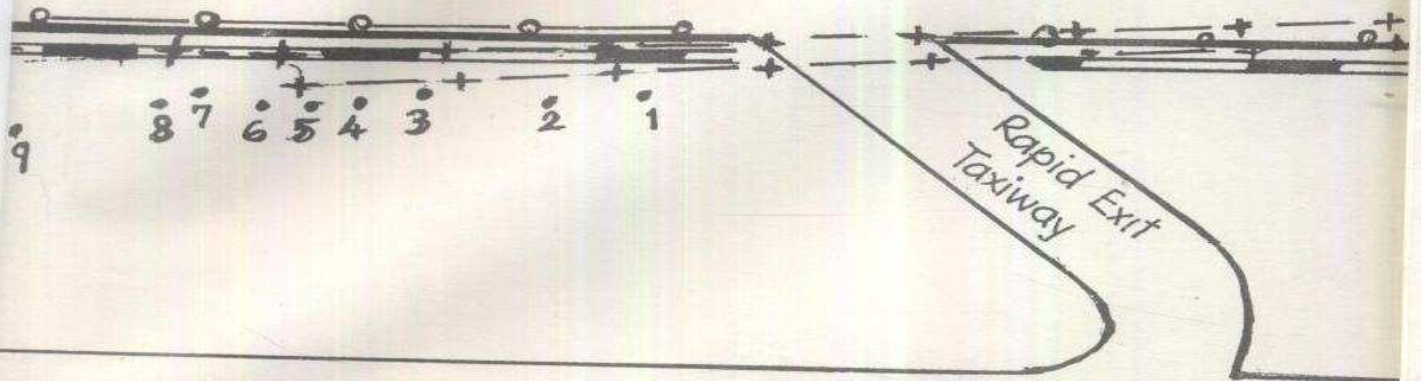
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# APPENDIX

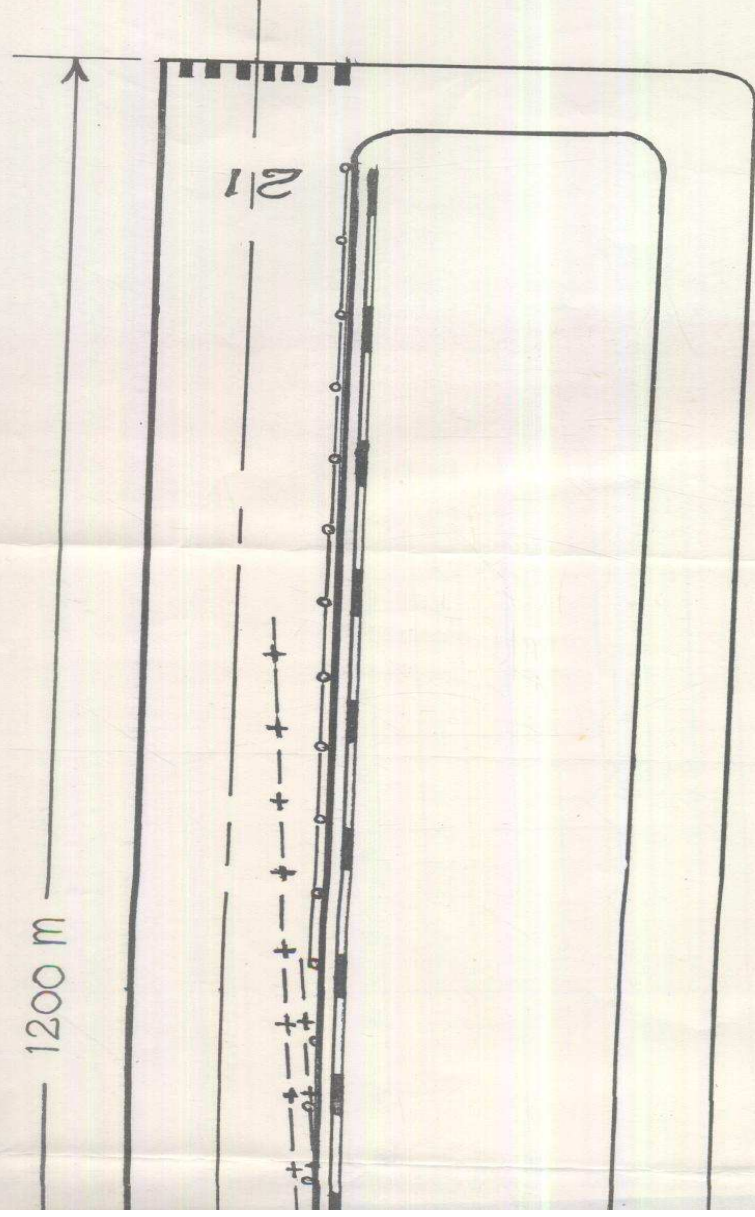
1200 5N-AUG WRECKAGE



- + Main gear tire marks
- The trench on the shoulder
- ○ Electrical Cables on the edge of paved Rwy

AGE TRAIL

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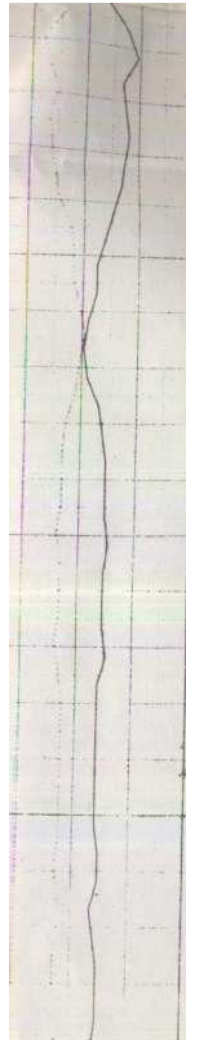
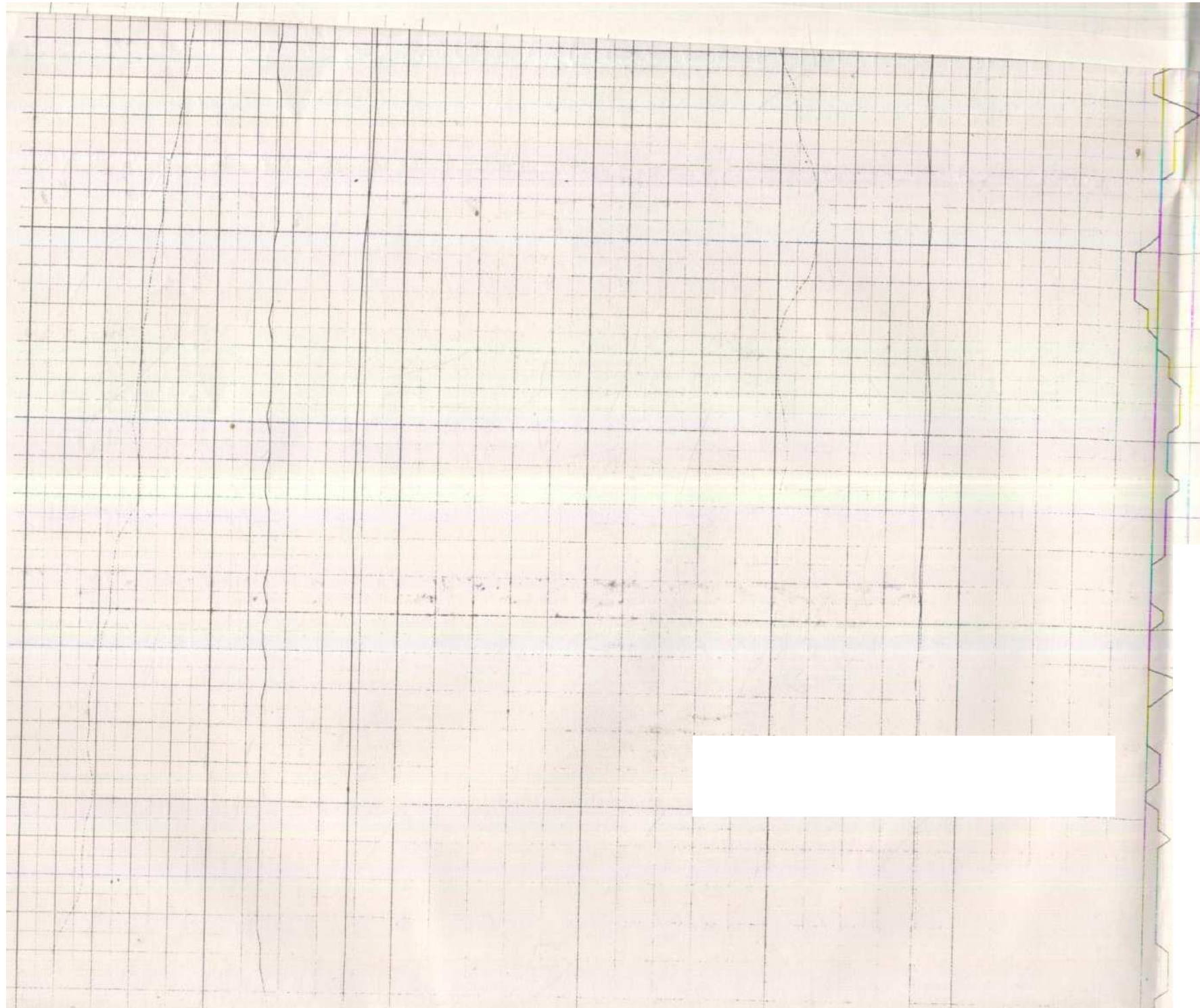


LEGEND

- 1 Engine acoustic linings
- 2 Fractured LH MLG
- 3 Nose gear assembly
- 4 Engine nacelle parts
- 5 Nose gear door

- 6 No 1 Engine Hydraulic Pulsation dampener
- 7. L.H MLG wheel boogie
- 8. L.H Landing light sealed lamp
- 9. Compressor blades
- 10 Part of thrust reverser bucket
- 11 No 1 Engine inlet





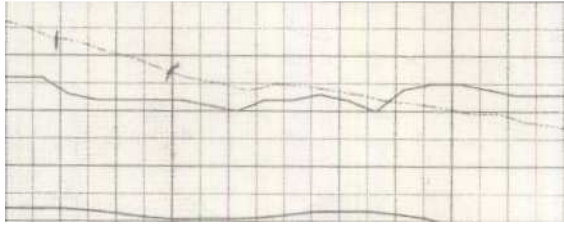
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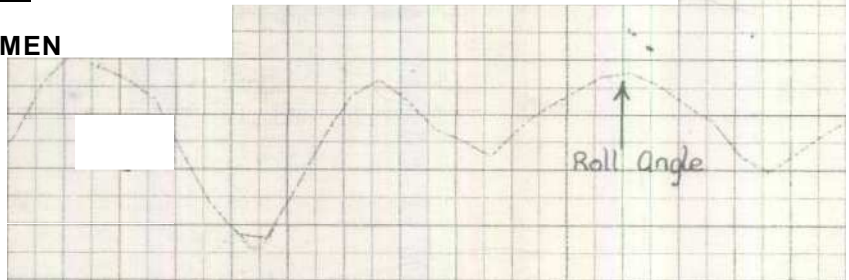
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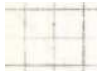


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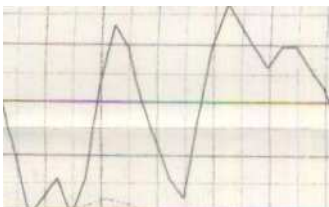


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Rudder Position

LH III'erpn



RH Aileron



