CIVIL AVIATION ACCIDENT
REPORT NO 04/376

FEDERAL REPUBLIC OF NIGERIA
MINISTRY OF AVIATION

FINAL REPORT

ON THE ACCIDENT TO THE

PAN AFRICAN AIRLINES (NIGERIA) LTD.

HELICOPTER BELL - 206-111B,

REGISTERED 5N-AVU

AT

CHEVRON PETROLEUM OKAN PLATFORM

ESCRAVOS, DELTA STATE, NIGERIA

ON SATURDAY 11TH NOVEMBER, 2000.

Federal Ministry of Aviation

Accident Investigation and Prevention Bureau

FEDERAL SECRETARIAT, SHEHU SHAGARI WAY, ABUJA.

Tel: 5238568

Ref. No. 04/376

5th April 2001

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

Civil Aviation Accident Report.

Madam,

I have the honour to present the final report on the accident to the **Pan African (Nig.) Ltd.** Helicopter, a Bell-206-IIIB, registered 5N-AVU at Chevron Petroleum **Platform, Okan, Escravos** on Saturday the 11th November, 2000.

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

FINAL REPORT ON THE ACCIDENT TO THE PAN AFRICAN AIRLINES HELICOPTER BELL-206 IIIB REGISTERED 5N-AVU AT CHEVRON OKAN PLATFORM, ESCRAVOS, DELTA STATE ON SATURDAY 11TH NOVEMBER,2000.

Aircraft Data

Type	-	Bell Helicopter
Model	-	Bell-206-IIIB
Registration	-	5N-AVU
Constructor's Number	-	2300
Date of construction	-	9th December 1977
Airframe Constructor	-	Bell Helicopters Textron, Texas, USA
Total Airframe Time	-	21,839 Hours
Total Airframe Cycle	-	162,903
Engine Type	-	Allison 250C-20B
Serial number	-	CAE-830459
Date of construction	-	10th February 1977
Engine Constructor	-	Allison Division of General Motors Corp.
Total Engine Time	-	21,325 Hours
Total Cycle	-	20,570
C of A Validity	-	9th March, 2001
Owner	-	Pan African Airlines (Nigeria) Ltd.
Operator	-	Pan African Airlines (Nigeria) Ltd.
Commander	-	Captain Joel A. Kamla
Nationality	-	Nigerian
Licence Held	-	ATPL – 3199H
Age	-	40 years
Total Time Exp.	-	8,211 Hours
Time on Type	-	7,700 Hours
Refueller	-	Isaac Dottie
Nationality	-	Nigerian
Age	-	39 years
Location of Accident	-	Okan platform New (150'ASL)
Geo Co-ordinate	-	N05° 33' 28", E005° 04' 39"
Date of Accident	-	11th November, 2000
Time of Accident	-	1200 Hours UTC.
Souls on board	-	1
Fatality	-	1

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Synopsis
5N-AVU started the day's flight operation as normal as what anyone would call another day of moving Chevron personnel back and forth from shore to oil rigs and platforms. After lunch break, the pilot decided to resume flying without assistance from the aircraft operator's personnel, who doubles as the aviation gas refueller and engine-start fire cover provider. But, as it turned out, the pilot started the engine and attempted to fly off without removing one out of three tie-down ropes. The resultant effect was very catastrophic and disastrous; he was the only casualty of the accident.

1.0 History of the flight

Pan African Airlines provides helicopter services to Chevron Petroleum and Gas Compression Company of Nigeria. 5N-AVU was one of the aircraft in this round the clock air transportation activity. Captain Kamla commenced duty on the day of the accident at 0549 hours Zulu operating the Bell-206B from Escravos to Delta South with 3 passengers. He departed Delta South for Okan Platform to continue with his assigned duties of the day. The helicopter was scheduled to arrive at the platform for 0700hours, but did not show up until 0758. It was however refuelled with 71 litres of aviation fuel Jet-A1. The refueller then secured the aircraft to the platform with three point tie-down to the observation of the commander, after which they both went to the mess hall for coffee. After coffee, the refueller went to his office. The refueller gave evidence that he was still in his office when he heard the engine-start and the helicopter departed, apparently after the commander had untied the aircraft by himself and took off on another assignment. The operator confirmed this practice as normal and acceptable.

At exactly 1000 hours, the helicopter came back and landed for lunch break whereupon the refueller secured the aircraft while the commander stood-by and watched him do so. When asked whether he needed fuel the commander responded in the affirmative and the refueller said he gave him 'eighty-something' litres. At about 1048 UTC the refueller had had his lunch and was walking out of the mess hall when the commander strolled in to have his. After the lunch, the captain came into the TV auditorium and found the refueller relaxing on a couch. But the commander remained standing to converse with another colleague of his. After the conversation at about 1150, the pilot just casually told the refueller, "I'm coming" to which the refueller responded "OK", taking for granted that the pilot was not ready to resume flying immediately.

When the pilot departed from the TV-room, he headed towards the helideck through the stairs where he met with Mr. M. D. A. Amaku-the environmental engineer and started to ask him the telephone number of a friend of his Mr. Abba Musa. Mr. Amaku asked the pilot where he was going and he responded that he was departing to Delta. Mr. Amaku gave evidence that he headed to the lower deck where he had a job to do, while the pilot proceeded upward through the stairs-way to the helipad. In less than five minutes, the refueller heard the helicopter's engine revving up for takeoff. What the refueller saw on his way up to the helipad, which is located directly above the platform structure, was the tail-boom floating on the surface of the ocean.
Apparently, the pilot had untied both the nose and the starboard tie ropes and had inadvertently left the port tie rope still secured on the skid before taking off from the helipad.

There was neither any known compulsive urgency nor any external pressure on him for the seemingly hurried departure.

1.2 **Injuries to persons**

Injuries	Crew	Passengers	Others
Fatal	I	Nil	Nil
Serious	Nil	Nil	Nil
Minor/None	Nil	Nil	

1.3 **Damage to Aircraft**
The aircraft was totally destroyed by impact with water.

1.4 **Other Damages**
There was not any significant damage to other properties, except for the outward edge of the platform's helipad-area safety skirt (appendix 5) which was slightly scraped by the rope when the helicopter was briefly suspended before the rope snapped.

1.5 **Personnel Information**

1.5.1 Captain Joel Adamu Kamla was a 40-year-old professional helicopter pilot, who held a Commercial Pilot License (CPL) No. 3179(H) issued in July 1988 by the Nigerian Civil Aviation Authority. His class I medical certificate was validated on the 7th September year 2000 for another 6 months. The captain's recurrent training was satisfactorily completed on the aircraft type Bell-206 B on the 7th March 2000 and his bi-annual proficiency flight Check was conducted on the 15th March 2000. He had also satisfactorily completed the FAA's requirement to become eligible to wear the 'Pilot Proficiency Wings Phase II' which was an attestation to this individual's dedication to aviation safety.

Captain Kamla's flying experience included helicopter BH-47, SA-365 Dauphin and Bell-206B-III. He had total flight time experience in excess of 8,211 hours; 7700 hours of which were on the type. He was therefore, perfectly qualified and current on Bell-206B-III, the type in which he had the accident. He had one time or the other worked for various helicopter operators, starting with the Aerocontractors, Ikeja in 1988/89. Capital Aviation Services, Kaduna in 1989/90 and later on with Pan African Airlines (Nigeria) Ltd. from 1990 till the time of death in the year 2000.

1.5.2 **Mr. Isaac Dottie** is a 39 year old Nigerian male, employed by Pan African Airlines, whose main duty was to refuel the company aircraft as they come to land on the platform. He also stands in as fireguard each time helicopters start their engines for any reason. He performs other general duties to assist the company technical crewmembers whenever they land their machines on the oil platform.

1.5.3 **Mr. M.D.A. Amaku** is a 34-year-old Nigerian male working as a Safety and Environmental engineer at Chevron Petroleum (Nigeria) Ltd. Myke Amaku's point of work at Chevron on the day of the accident was at Okan Platform. The deceased pilot was a close friend of his and Myke was the last man the pilot talked to on his way up to the helideck for the last flight.

1.6 **Aircraft Information**

5N-AVU was first registered in Nigeria on the 22nd February 1989. The Bell-206B-III was registered to the Pan African Airlines (Nigeria) Ltd. in transport operation category. The last certificate of airworthiness (C of A) was valid till 9th March 2001. Before the catastrophic accident, the aircraft operated for the total airframe time of 21,839 hours and 162,903 cycles. The last major maintenance inspection carried out on the aircraft was for the purpose of "Certificate of Airworthiness" renewal at the airframe time of 20,743 hours. At 21,499 hours the engine's compressor assembly was replaced with another one due to the component's time out. Nothing was specifically unusual concerning the maintainability and the airworthiness status of the helicopter.

1.7 **Meteorological Information**

It was a visual flight in clear and sun filled day.

1.8 **Aids to Navigation**

No Navigation aids involved.

1.9 **Communication**

There was no problem with radio communication.

1.10 **Helipad Information**

Okan Production Platform is an offshore living quarters for Chevron Petroleum Personnel distancing about five minutes flight from *Escravos Tank Farm*, which encompasses the only airstrip and other land based facilities. The helipad is about 45.72 metre (150ft) above sea level on a steel structure, under which the living quarters and other facilities are constructed. Okan Platform is one of more than 300 helipads, which dots the offshore coastline in close proximity to one another.

The deck itself is about 13.7m by 13.7m (45' X 45') in area and more than enough to contain the helicopter. On the helipad there are about 6 tie-down large nylon ropes to restrain helicopter from being blown overboard in case there is a gale wind or any other unpredictable weather elements from the high sea. Not taking chances, helicopters are perpetually tied down as soon as they land on the deck and when no pilots are sitting in the cockpit.

The outside edge of the flat helipad is known as the "safety skirt" (Please see appendix 4), whose outboard is protected with aluminium plate strips. The plate strip was pulled back at the point of contact by the rope while the helicopter was precariously dangling upside down under full engine power.

1.11 **Flight Recorders**

No Flight Data Recorder or Cockpit Voice Recorder installed.

1.12 **Wreckage and Impact Information**

The aircraft was tethered to the end of a 23ft long tie rope when it rose above the helipad. There was restriction in both lateral and vertical planes of motion when the aircraft attempted to fly away but the rope tension jerked the helicopter back to the left side, flinging it off the platform. The helicopter was suspended for a few seconds in a pendulum effect until the rope snapped with 4ft of the rope still tied to the skid (please see appendix 8). Then, the helicopter fell into water landing about 200 ft away from the platform's base. Impact with water was very enormous which

destroyed the whole cockpit area and the cabin section. It was very devastating both to the occupant and the fuselage.

1.13 **Medical and Pathological Information**

A very detailed and comprehensive autopsy report was issued out on the 15th November 2000 by a pathologist, Doctor Wilson O. Akhiwu MBBS, M.Sc.(Tox.) , describing the type of injury as "anterior half of the head and face neatly sliced off, exposing the cranial cavity that contains no cerebral hemispheres". Describing further on the cause of death, the doctor stated that there is a post mortem (after death) injury on the right upper arm breaking the right humorous and tearing the muscles around it. "The exposed tongue is markedly cyanosed. There is no oedema", he concluded.

1.14 **Fire**

There was no fire outbreak.

1.15 **Survival Aspect**

The accident was in no way survivable

1.16 **Tests and Research**

None required in this accident

1.17 **Organisation and Management Information**

1.17.1 Chevron Petroleum and Gas Compression Company of Nigeria is a petroleum exploration company in the Delta Region of the South Southern part of Nigeria. Chevron has a contractual agreement with Pan African Airlines (Nig.) Ltd to provide onshore and offshore air transportation services for personnel and equipment movement for the petroleum exploration in Nigeria.

1.17.2 Pan African airlines (Nigeria) Ltd is an air operator and the owner of a fleet of fixed-wing and rotary-wing aircraft with the primary purpose of supporting oil exploration in Nigeria. The safety operation of the company aircraft rests solely on the operator.

1.18 Additional Information

1.18.1 The airworthiness of the aircraft was unquestionable. The certificate of airworthiness was to expire on the 9th March 2001. The certificate of insurance was valid from 03 September 2000 to 03 September 2001. The aircraft aeronautical radio communication license was renewed on the 15th June 2000 for another year. Certificate of maintenance (C of M) was valid until midnight of 23 December 2000. There was no single deferred defect item recorded in its *Technical Logbook.*

1.18.2 Captain Kamla was 40 years of age and had never married, although he was known to have had few friends. He loved to smoke cigarette and he enjoyed drinking coffee. The captain was observed not excited to work the previous morning, but he did not complain to anyone. The workload of the pilot was like any other pilot's flight schedule of: three weeks on the work and three weeks off the work. Captain Kamla's work roster in the last three months of his career before the accidents looked like this: starting work on the 15th August 2000, he worked for 21 days until 4th September and was off duty for another 32 days. He resumed duty on the 7th October 2000 and worked for 17 days then took off duty from 24th October 2000. He was off for 17

days when he was recalled and started flying on the 10th November only to crash on the 11th November 2000. His daily flight hour for August/September was averaging 4hours.37minutes and 5hours.11minutes in the month of October 2000.

2.0 Analysis

2.1. Captain Kamla started working for Pan African Airlines (Nig) Ltd. since July 1992 until this fatal accident in November 2000. This was the longest time he ever worked for an helicopter operator since he began his professional flying career in 1988. He seemed to have been happy and contented with the company. His duty and flying hours arrangement with the company had been on for several years as it had also been for the other employee pilots of the company. The pilot had just been recalled from rest period after spending 17 days out of the normal 21 days and his performance on the first day at work was without any incident or premonition to an on-coming fatal accident. He had been performing the same routine job as cautiously as possible for the past 8 years doing his pre-flight inspections, which involves, occasionally, untying the tie-down ropes whenever necessary and there had been no near-miss occasion of attempting to fly his helicopter without proper walk around. He used to be very thorough and meticulous about safety matters. AIB does not think that coming back from leave after 17 days of rest, resuming duty at 12.30PM. local time a day before the accident and flying for 3hours and 15minutes out of the 6 hours on-duty time could be considered as stressful and be assessed as a fatigue factor in this accident.

In March 2000, Captain Kamla had just attended the Bell 206B Refresher Training Course provided by the Bell Helicopters Customer Training Academy. He completed the training satisfactorily and was awarded a certificate. Also, at the same period of his Bell 206B Refresher Training Course in America, Captain Kamla was awarded a Pilot Proficiency Award Program Certificate after he had satisfied the Federal Aviation Administration of the US Department of Transportation. This award made him eligible to wear the "Pilot Proficiency Wings" Phase II, which was an attestation to the Pilot's dedication to aviation **SAFETY.** However, Phase II is the second stage in the 20-stage FAA Wings Program. He was just on the threshold of the 20-step staircase to the apex of the FAA's "Pilot Proficiency Wings" program.

2.2. Autopsy report did not show traces of alcohol, drug abuse or any other abnormal toxicology. There were no traces of the captain's being under one sort of anti-depressant drug or any other medication. He was, therefore, a perfectly normal, coherent and cool-headed gentleman who was psychologically amiable to all co-workers who came across him.

2.3. Mechanics of the rope's failure, although an immaterial factor in this accident, reveals that the rope ruptured owing to forces acting on it. AIB discovers, during the investigation, that the rope failed, because of the high frequency vibration that is normally associated with rotary wing aircraft, in combination with the sharp serrated edge of the safety skirt strip, which was acting on the rope like a sabre-saw. The improvised saw had initiated the clean severance of two out of three nylon strands that

form the girth of the rope, the third strand also failed under tensile load, because it was no longer strong enough to sustain the weight of the aircraft. (Please see Appendix 7).

From the onset of the restrained flight, the helicopter had been flung overboard and was dangling upside down on the rope with the engine still running at full power. It could be postulated that the pilot had been, by this moment, seriously disoriented and had become hopelessly unconscious to the effect that he was no longer in control of the helicopter. If there had been no rope severance, the engine could still be running at full power until fuel starvation. In the alternative, the helicopter would have caught fire, because Bell-206B helicopters are not designed to operate in an inverted position. The result of the fire could have affected a section of the Okan platform structure, which could have caused panic and unnecessary stampede on the whole platform. There is no recommendation to suggest from this aspect of the accident because of its unprecedented uniqueness and any unforeseeable repetition of this type of mishap in the nearest future.

2.4 AIB tries to take a cursory look at this unfortunate, preventable accident and also tries to detect, if possible, whether any underlining cause for a highly defined and thorough-bred pilot such as Captain Kamla could commit an inexcusable and costly oversight as it occurred in this accident. It is an important element in the initial training of every pilot to perform a walk-around inspection of his or her aircraft before anything else is done in the machine. It is believed that Captain Kamla performed this task, because he removed 2 out of 3 security ropes before attempting to fly. He was actually aware that there were three ropes to untie because he was standing-by while the refueller was performing the tie down before they both departed for lunch break. Was it an act of silly omission, (for which he paid the supreme price) that the pilot forgot to undo the third rope? Only the pilot would have been able to explain the reason if he had lived.
On the first departure from the Okan Platform on the day of the accident, the captain had, for inexplicable reason, cleverly eased out the services and assistance from the refueller by proceeding to the helideck unannounced to the detriment of the refueller. On reaching the helipad, he untied the three ropes by himself and then flew out without any indication of excitement, worry or haste about the flight. The refueller gave evidence that he was waiting in his own office for the pilot to finish his coffee and the pilot would hint him that he was ready to depart from the platform.

On the second landing on the platform at about 11 o'clock local time, the refueller filled up the helicopter's tank with about 84 litres of Jet-A1 and performed the tiedown before both of them went downstairs together to the living quarters. Customarily at Okan Platform cafeteria, lunch is not ready until 11.30AM. So to kill the time, the refueller went to games room while the pilot went to make telephone calls. After lunch the refueller went into the TV room and the pilot came in later from lunch to discuss briefly with some of his friends. The fueller was still sitting when the pilot made a gesture to him saying "I'm coming" and he disappeared from the TV-room.

Like in the earlier departure flight, the captain repeated the same lackadaisical attitude of "not ready to resume immediate flying" to the refueller only to begin to go towards the upper deck where the helicopter was tethered. On the way, Captain Kamla met

with Mr Amaku and stopped briefly to discuss about another friend and collected the friend's telephone contact numbers. After the conversation, Mr Amaku inquired where the pilot was departing to and the captain responded whimsically "Delta" then continued upwards through the stairway to his helicopter. On reaching the helicopter, Captain Kamla apparently untied 2 of the ropes that were securing the helicopter and whether by an act of omission or commission, forgot the 3rd rope still fastened to the helicopter's left skid.

The next event was that the pilot did not complete his pre-departure safety walk around inspection and he jumped into the cockpit, started the engine and lifted the helicopter from the deck. He was, of course, arrested from flying away by the tie rope and the helicopter was violently jerked back, not back to the deck but was flung "free fall" some 184 ft (platform height & 19 ft of rope) down into the sea. The impact with water was devastating to both the aircraft and its sole occupant.

2.5 Now analytically looking at the accident in retrospect, the AIB is faced with more questions than answers. Questions such as, " was the accident preventable?". Yes of course, the accident was definitely preventable. But the questions which would remain unanswered for some time to come are: (i) Why would a pilot display an attitude of not being ready to resume immediate flight to his co-worker and then cunningly jump into the helicopter in an attempt to blast off? Over confidence, one would tend to think, but overconfidence in this profession kills faster than under-confidence. (ii) Why would a pilot deceive his subordinate worker into believing one thing only for the pilot to take an opposite action, which involved extra rigour of untying the ropes that he should have, otherwise, relegated to a junior help to perform? Avoidance of the junior officer to perform the duty for which he is being paid could incur the risk of engine-fire which, in itself, is another accident inducing act contravening the company's instructions and the national air navigation regulation. (iii) So why was the pilot indulged in the unorthodox practice of not using the refueller's service which was provided for him? (iv) What is the ultimate gain of not using the human resources especially when such a service was readily available?

The accident could have been prevented if the pilot had allowed the second aviation personnel, who stood-in as a fire guard or as a dispatcher, to remove the ropes and then be at the stand-by to observe the engine start-up and the aircraft's departure from the deck. The oversight of the forgotten third rope could have been quickly perceived or apprehended by the second eye of the junior officer, who would have frantically signalled the pilot to abort take off if anything untoward was observed. AIB is not professing that the accident has a suicidal undertone but believes that the mishap was definitely avoidable and absolutely preventable. The accident is preventable in that, if the second personnel had been allowed to participate in the operation of every arrival and departure of every helicopter from the deck, such a participant's presence could have saved and prevented this accident.

2.6 When workmen operate in a very small number say, of two or three people in a group, such as in the case of the pilot and the Refueller being the only group of aviators on the deck. The induced fraternity or sorority psychologically gives room to undue laxity and relaxation of regulations. It gives room to unnecessary co-operation to forge an unhealthy allegiance of "rub my back and I rub your back or you can have undue off duty today and I'll take my turn next". This sort of unholy agreement

among members of staff often backfires to the worst consequences. If the helicopter's operation at this particular platform does not require two-man operation, the operator would not have assigned a ground handler to assist the pilot. But the co-operation had allowed ingress of unlawful loophole that accumulated to this accident. There were only two workmen (the pilot and the refueller) of the operator's that were present on the Okan Platform and some other platforms like this, the workers had come to take advantage of the situation and had down played many important aspects of aviation safety operation. They'd better not do this when operating on land or at any other airport where the eyes of the aviation safety authorities will observe the unorthodox procedure of not doing what's supposed to be done to ensure maximum safety and that is the crux of this matter. The helicopter personnel at Okan Platform and probably other platforms are not doing what they were supposed to do, that is, all hands must be on deck for dispatch of flights.

3. Conclusions

3.1. Findings

3.1.1. This Bureau could establish that the helicopter was properly registered in accordance with the Civil Aviation Regulations of the Federal Republic of Nigeria.

3.1.2. The pilot-in-command was also found to be properly licensed and qualified to fly the helicopter type that was involved with the accident.

3.1.3. Chevron Petroleum and Gas Compression Company is not involved with the operation of aircraft more than to provide safety environment on the oil-rigs and platforms, for the flight operator.

3.1.4. Pan African Airlines (Nigeria) Ltd. is the operator who provides both fixed wing and rotary wing air operations to support the Petroleum Exploration Company – Chevron.

3.1.5. It is also established that Okan Living Quarters platform is one of the 300 landing pads which are concentrated within the birds' eye-view area off the coastline, for helicopter operation under Chevron Company and it is one of the few platforms with helicopter refuelling facility.

3.1.6. Other rigs are just " for touch and go" operations without flight operator's personnel and no tie down security ropes provided.

3.1.7. On Okan platform and few others with various helicopter operation services, on hand personnel are provided to assist aircraft tie-down security and refuelling facility.

3.1.8. The Pilot was recalled from off after resting for 17 days and performed his normal duties, that was the day before the accident, without any incident; but looked melancholy, which made the refueller working with him to think that **maybe** he was not happy for being recalled short of his full 21 days rest. He, however, performed his duties without any incident.

3.1.9. The first flight on the day of the accident started at 0603 hours UTC and the 1st landing at Okan platform was executed at 0758 hours, some 58 minutes behind schedule, no reason was given for that delay. On landing, the aircraft was secured with three tie-down ropes before the pilot and the ground assistant (refueller) went for coffee.

3.1.10. When it was time to resume on a flight, the captain did not hint his ground assistant, but he did untie the three ropes and started the helicopter's engine without fire guard departed on his mission. This is not one of the safe practices recommended in the Pan African Airline's Company "Operation Manual" approved by the Nigerian Civil

Aviation Authority, because there was no fireguard for the engine start in case there was fire outbreak during the starting.

3.1.11. The aircraft was equally tied down at three points when the aircraft arrived for lunch break at 1000 hours UTC. The pilot stoodby while the ground handler was securing the helicopter with the three ropes.

3.1.12. After lunch, only the pilot knew his own intention of departing from the platform and when he was ready, he was deceptive about it by saying "I'm coming" to the ground assistant and then proceeded to the helipad, where he untied 2 out of the 3 ropes before hopping into the cockpit and thereafter proceeding to start the engine without fireguard.

3.1.13. The company's ground handler was available for the pilot's services but the pilot was not willing to carry him along for any assistance.

3.1.15 It was baffling and inexplicable that the pilot attempted to fly off with one rope still secured to the helicopters' left skid tube. No antidotes for forgetfulness.

3.1.16 The helicopter was, of course, restricted and prevented to fly away. The airborne was restricted to the locus radius of the rope and was violently brought down, not only brought down, but also violently flung some 160ft below the deck's surface into the sea.

3.1.17 The safety lapses on the deck resulted into this accident thereby causing destruction to life and property.

3.2. Cause of the accident.

3.2.1 The probable cause of the accident was the pilot's oversight of not executing his pre-departure walk-around inspection diligently, leading to the port tie rope still secured on the skid before takeoff from the helipad.

3.2.1. The contributory factor in the accident is the absence of the ground handler/fireguard/refueller, whom the pilot's decision to fly without his duplicate inspection of seeing to the safe operation of 5N-AVU on the helipad on that eventful day.

4.0 Recommendations

4.1 Offshore Helicopter Operators may like to be more stringent with their technical personnel who are operating away from effective management strict observations. A way must be designed for the operators to monitor the activities of their personnel and not to be complacent all the time.

4.2 All offshore helicopter operators and petroleum explorators may co-opt inculcating the oil company's Marine Safety Officers on platforms into recognising aviation potential dangers and let them take prompt necessary actions to discourage any unorthodox operation. The marine safety inspectors are not mandatory to be present at all times, but the awareness that they may be watching will serve as deterrent to pilots and aviation ground crew. For instance, starting transport category aircraft engine without fireguard is one of those dangerous procedures that can cause fire on the helipads.

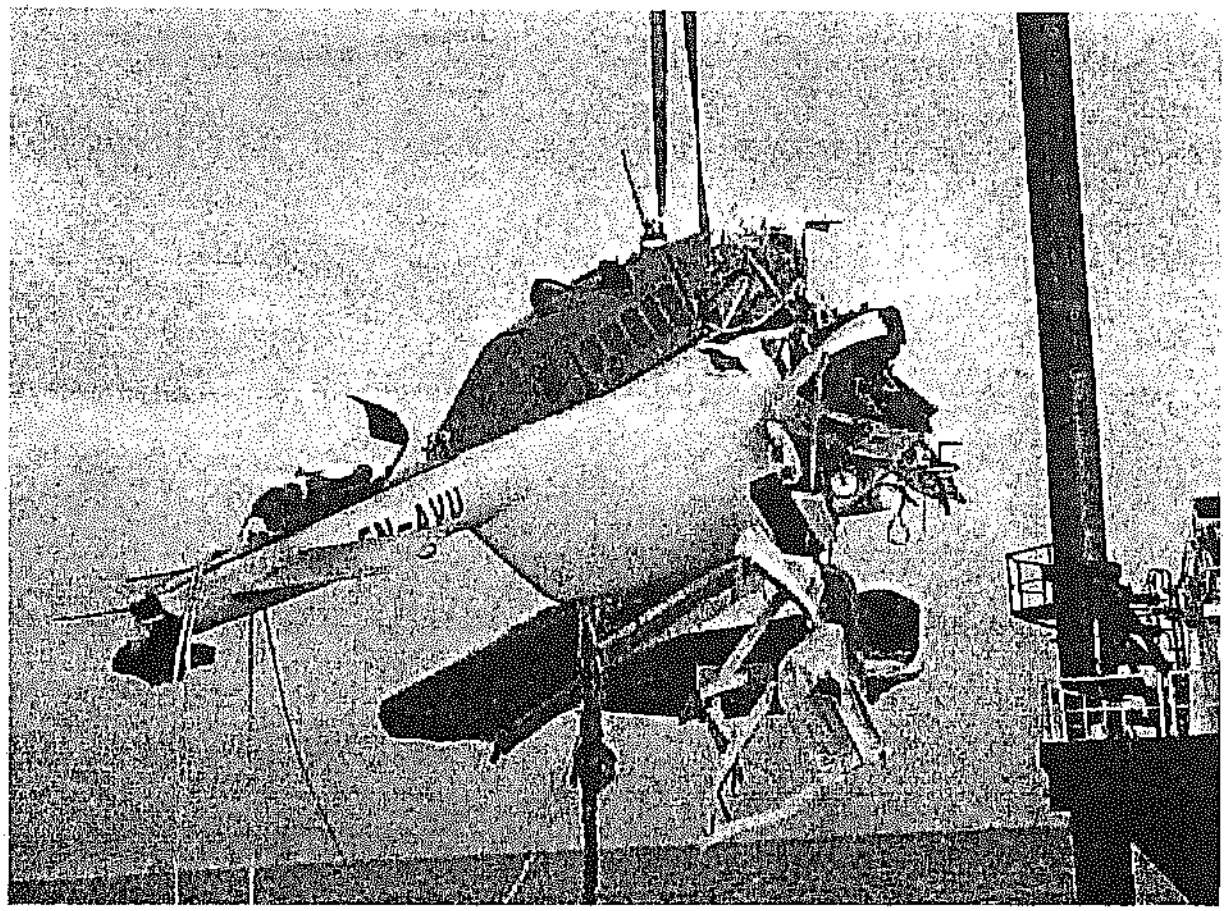
5.0 Appendices

5.1 The photograph showing recovery of the wreckage from the sea.

5.2 Picture showing the uploading of the wreckage onto the boat.

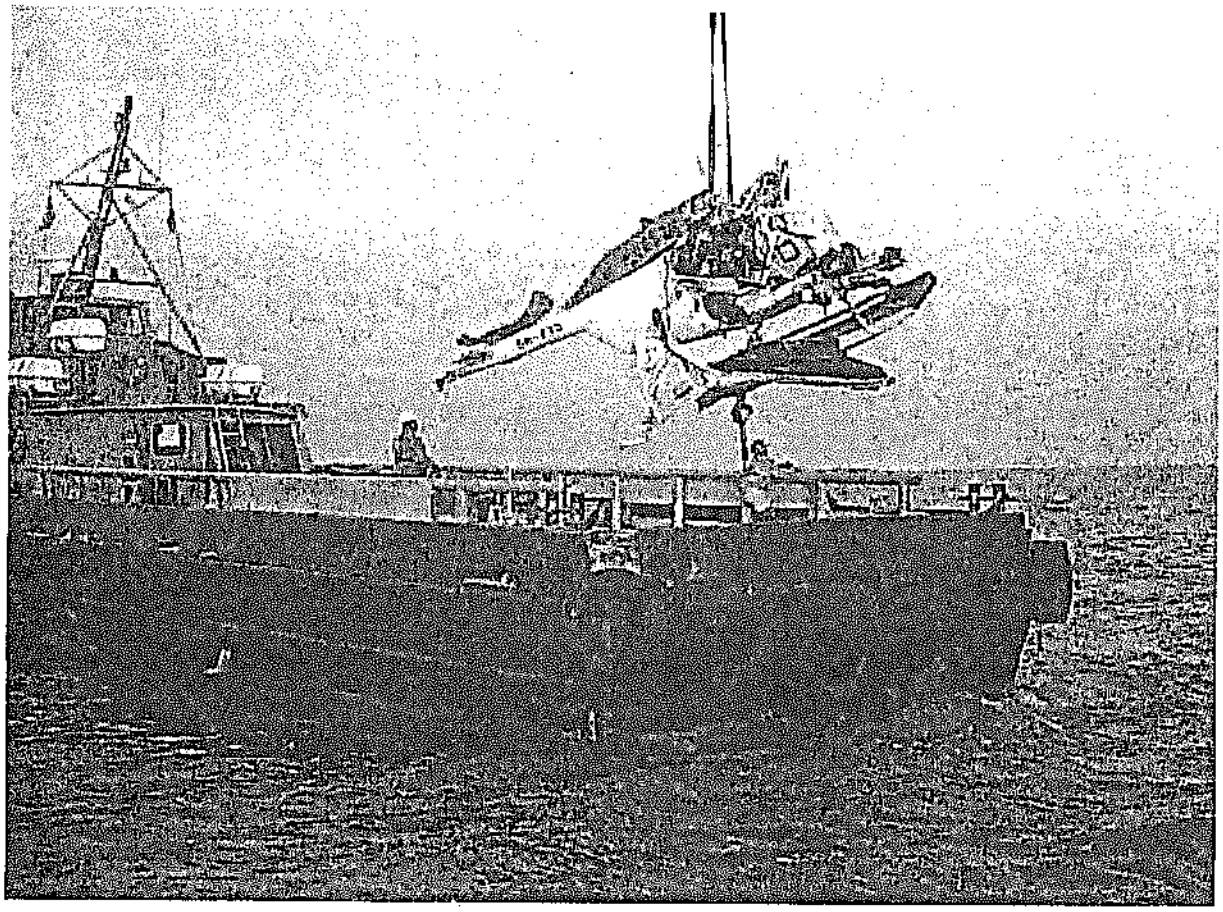
5.3 A photograph showing the helipad area dimensions and the safety skirt at the far extreme of the pad.

APPENDIX 5.1



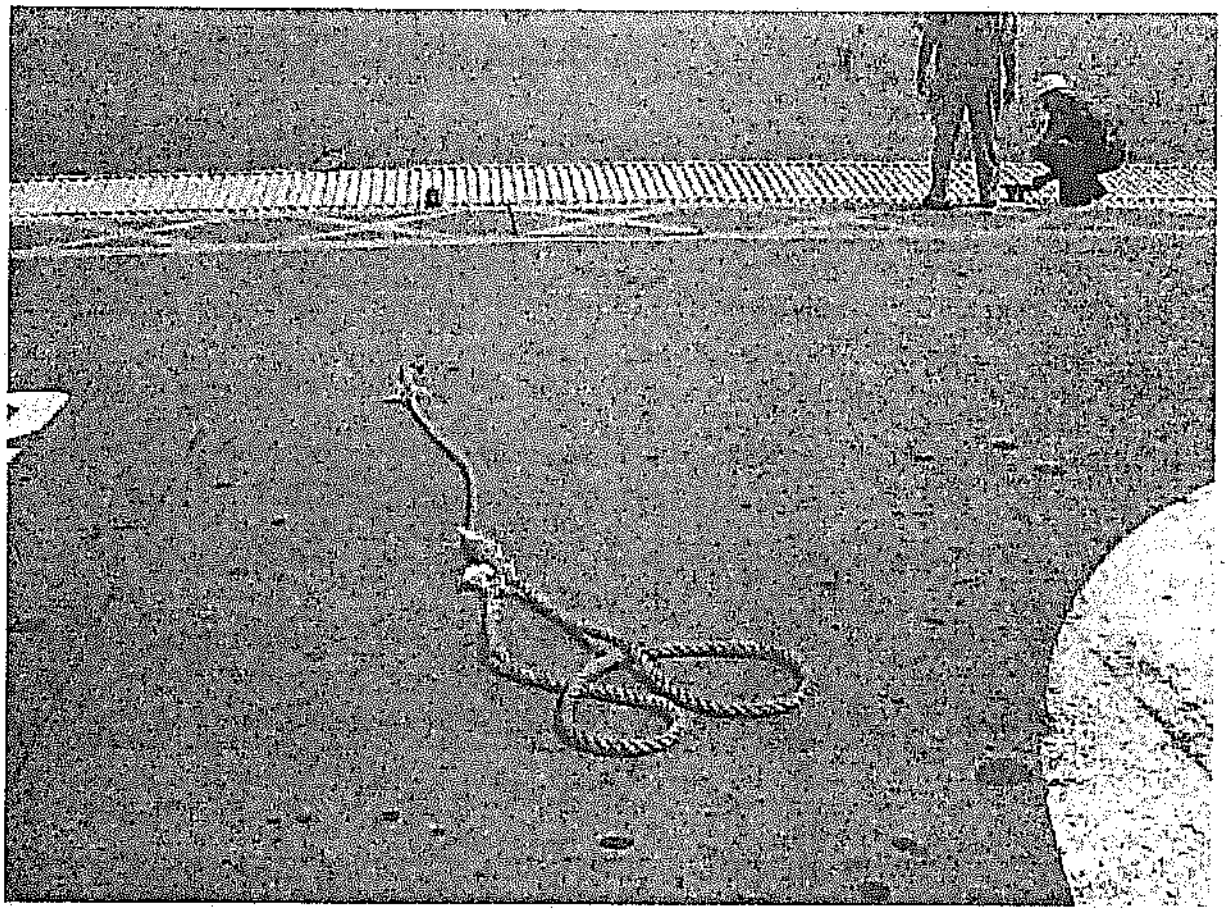
Recovering the wreckage from the sea

APPENDIX 5.2



Uploading the wreckage onto the recovery boat at sea for transportation to Chevron Tank Farm at Escravos.

APPENDIX 5.3



A section of the 45' X 45' area helipad after the accident, showing the already failed tie-down rope on the fore ground.