

<b>AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY</b>
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				Reference:	CA18/2/3/9348	
<b>Aircraft Registration</b>	ZS-FPU	<b>Date of Accident</b>	25 August 2014		<b>Time of Accident</b>	0735Z
<b>Type of Aircraft</b>	Cessna 414		<b>Type of Operation</b>		Maintenance Flight Test (Part 43)	
<b>Pilot-in-command Licence Type</b>		Commercial	<b>Age</b>	26	<b>Licence Valid</b>	Yes
<b>Pilot-in-command Flying Experience</b>		Total Flying Hours	542.8		Hours on Type	248.1
<b>Last point of departure</b>		East London Aerodrome(FAEL): Eastern Cape				
<b>Next point of intended landing</b>		East London Aerodrome(FAEL): Eastern Cape				
<b>Location of the accident site with reference to easily defined geographical points (GPS readings if possible)</b>						
Runway 06 at FAEL GPS S33°02.05' E027°49.20' elevation 435 feet AMSL						
<b>Meteorological Information</b>		Wind: 300°/ 08kts; Visibility: >10km; Temperature: 18°C				
<b>Number of people on board</b>	2+0	<b>No. of people injured</b>	0	<b>No. of people killed</b>	0	
<b>Synopsis</b>						
<p>A Cessna C414 ZS-FPU was taken to AMO on 21 August 2014 for a maintenance repair. The aircraft was taken to the workshop to repair a hydraulic leak in the left hand main wheel well After the repair was done on the 24<sup>th</sup> of August the aircraft was taken for a test flight.</p> <p>On completion of the test flight, during final approach to Runway 06 the undercarriage was selected down and the left hand main gear did not extend. The pilot flew past the tower and the air traffic controller (ATC) reported that the left main gear was not extended. The pilot then landed the aircraft with the right hand main gear and the nose gear extended. The aircraft veered off the runway to the left and came to a stop on the grass next to the runway.</p> <p>The aircraft sustained damage to the left wing, left propeller, and the underbelly.</p> <p>Investigation revealed that the rigid pipe in the left main gear wheel well separated from the main landing gear up-lock cylinder. Thus the left main gear did not extend. There is no reference to the passengers and to the injuries. There is no technical basis of the failure. There is no investigation to the failure (over tightening). Include what could be the possible failure to be included in the analysis.</p>						
<b>Probable Cause</b>						
Unsuccessful forced landing due to the left main gear failure to extend on final approach as a result of the failed rigid hydraulic pipe fitted in the main wheel well.						
SRP Date	12 September 2017		Release Date	19 September 2017		

## AIRCRAFT ACCIDENT REPORT

**Name of Owner** : Blucrane Air  
**Name of Operator** : Blucrane Air  
**Manufacturer** : Cessna aircraft company  
**Model** : Cessna 414A  
**Nationality** : South African  
**Registration Marks** : ZS-FPU  
**Place** : East London Aerodrome  
**Date** : 25 August 2014  
**Time** : 0735Z

*All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.*

### **Purpose of the Investigation:**

*In terms of Regulation 12.03.1 of the Civil Aviation Regulations (2011) this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and not to establish blame or liability.*

### **Disclaimer:**

*This report is produced without prejudice to the rights of the CAA, which are reserved.*

## **1. FACTUAL INFORMATION**

### **1.1 History of Flight**

1.1.1 A Cessna C414 ZS-FPU was taken to AMO on 21 August 2014 with maintenance defects to be rectified. One of the defects was a hydraulic leak in the left main wheel well. The defect was rectified and the aircraft was taken for a test flight. The pilot reported the following: on completion of the test flight during final approach to Runway 06 he selected the undercarriage down but it did not extend. He then used the emergency blow down bottle but only the nose and right main gear deployed. The pilot then informed the ATC and requested to do a fly past so that the ATC could visually verify that gears are down. The ATC confirmed that the left main gear was not extended.

1.1.2 The pilot landed the aircraft with the two wheels extended. Once slowed down the left wing made contact with the runway. The aircraft veered off the runway to the left because the pilot could not maintain directional control. The aircraft came to a stop on the grass left of Runway06 near intersection 06/24 and 11/29.

1.1.3 The accident happened during daylight on runway 06 at the following GPS coordinates S33°02.05' E027°49.20' elevation 435 feet AMSL

The point where the aircraft came to a stop



Figure 1: East London airport Runway 06 as found on the internet

## 1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	2	-	-	-

Note: No passenger should be in the aircraft during a test flight in terms of CAR Part 43.02.16(2) which states, "Only essential crew shall be carried aboard any aircraft undergoing a test flight."

## 1.3 Damage to Aircraft

1.3.1 The aircraft sustained substantial damage.



**Figure 2:** The aircraft as found at the accident site

## 1.4 Other Damage

1.4.1 None

## 1.5 Personnel Information

Nationality	South African	Gender	Male	Age	26
Licence Number	0272236969	Licence Type	CPL		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Instructor, Instrument, Night and Flight test				
Medical Expiry Date	30/11/2014				
Restrictions	None				
Previous Accidents	None				

Flying Experience :

Total Hours	542.8
Total Past 90 Days	15.9
Total on Type Past 90 Days	15.9
Total on Type	248.1

## 1.6 Aircraft Information

1.6.1 The Cessna C414A is a light, pressurised, twin engine, low wing cantilever monoplane with a conventional tail unit and a retractable tricycle landing gear. It is powered by two wing-mounted Continental horizontally opposed-six piston engines.



**Figure 3:** Photo of the aircraft found on the internet.

**Airframe:**

Type	Cessna C414A	
Serial Number	414-A0505	
Manufacturer	Cessna Aircraft Company	
Date of Manufacture	1980	
Total Airframe Hours (At time of Accident)	4218.4	
Last MPI (Date & Hours)	24/07/2014	4204.4
Hours since Last MPI	14	
C of A (Issue Date & Expiry Date)	06/11/2012	05/11/2014
C of R (Issue Date) (Present owner)	18/06/2012	
Operating Categories	Standard Part 135	

**Engine:**

Right hand engine

Type	Continental
Serial Number	822383-R
Hours since New	1314.4
Hours since Overhaul	Not yet reached

#### Left hand engine

Type	Continental
Serial Number	822380-R
Hours since New	1314.4
Hours since Overhaul	Not yet reached

#### **Propeller:**

##### Right hand propeller

Type	McCauley
Serial Number	960942
Hours since New	2175.3
Hours since Overhaul	218.3

##### Left hand propeller

Type	McCauley
Serial Number	961100
Hours since New	2175.3
Hours since Overhaul	218.3

### **1.7 Meteorological Information**

Weather as obtained from pilot questionnaire

Wind direction	300°	Wind speed	08kts	Visibility	>10km
Temperature	18°	Cloud cover	Nil	Cloud base	Nil
Dew point	unknown				

### **1.8 Aids to Navigation**

1.8.1 The aircraft was equipped with standard navigational equipment for the aircraft type as approved by the regulating authority.

### **1.9 Communications.**

1.9.1 The aircraft was equipped with standard communication equipment for the aircraft type as approved by the regulating authority.

## 1.10 Aerodrome Information

Aerodrome Location	East London FAEL	
Aerodrome Co-ordinates	S33° 02' 06" E027° 49' 16"	
Aerodrome Elevation	435 feet AMSL	
Runway Designations	06/24	11/29
Runway Dimensions	1585 x 46	1939 x 46
Runway Used	06	
Runway Surface	Asphalt	
Approach Facilities	Runway Lights, VOR, ILS and DME	

**Note:** The aerodrome has a valid licence certificate

## 1.11 Flight Recorders

1.11.1 The aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR), nor was it required to be fitted to this type of aircraft.

## 1.12 Wreckage and Impact Information.

1.12.1 On the 21 August 2014 the aircraft was taken to the workshop to repair a hydraulic leak in the left hand main wheel well. The engineer found that a rigid hydraulic line was leaking due to corrosion porosity hidden by a supporting clamp. The rigid line was removed and a new line was manufactured according to F.A.A Advisory Circular AC 43-13(Acceptable methods, techniques and practices- aircraft inspection and repair)

1.12.2 Numerous retraction tests were done to verify that the undercarriage was operating correctly and to check for any hydraulic leaks. The hydraulic reservoir was replenished to the correct levels and the aircraft was signed-off for a test flight.

1.12.3 The aircraft landed with the nose and right main gear, after the left main gear failed to extend. After landing on Runway 06, once the aircraft slowed down, the left wing made contact with the runway. The aircraft veered off the runway to the left. The pilot reported that he could not maintain directional control, the aircraft came to a stop on the grass left of Runway 06 near intersection 06/24 and 11/29.

1.12.4 During inspection by the pilot after disembarking the aircraft, it was found that the aircraft sustained damage to the left wing, left propeller, and the underbelly.

1.12.5 Post-accident investigation revealed that the rigid pipe separated from the main landing gear up-lock, which caused the hydraulic fluid to leak again. All other serviceable hardware was found in place and correctly fitted. The supporting sleeve at the attachment to the up-lock cylinder was cracked. As shown in figure 4 and 5 part 94A

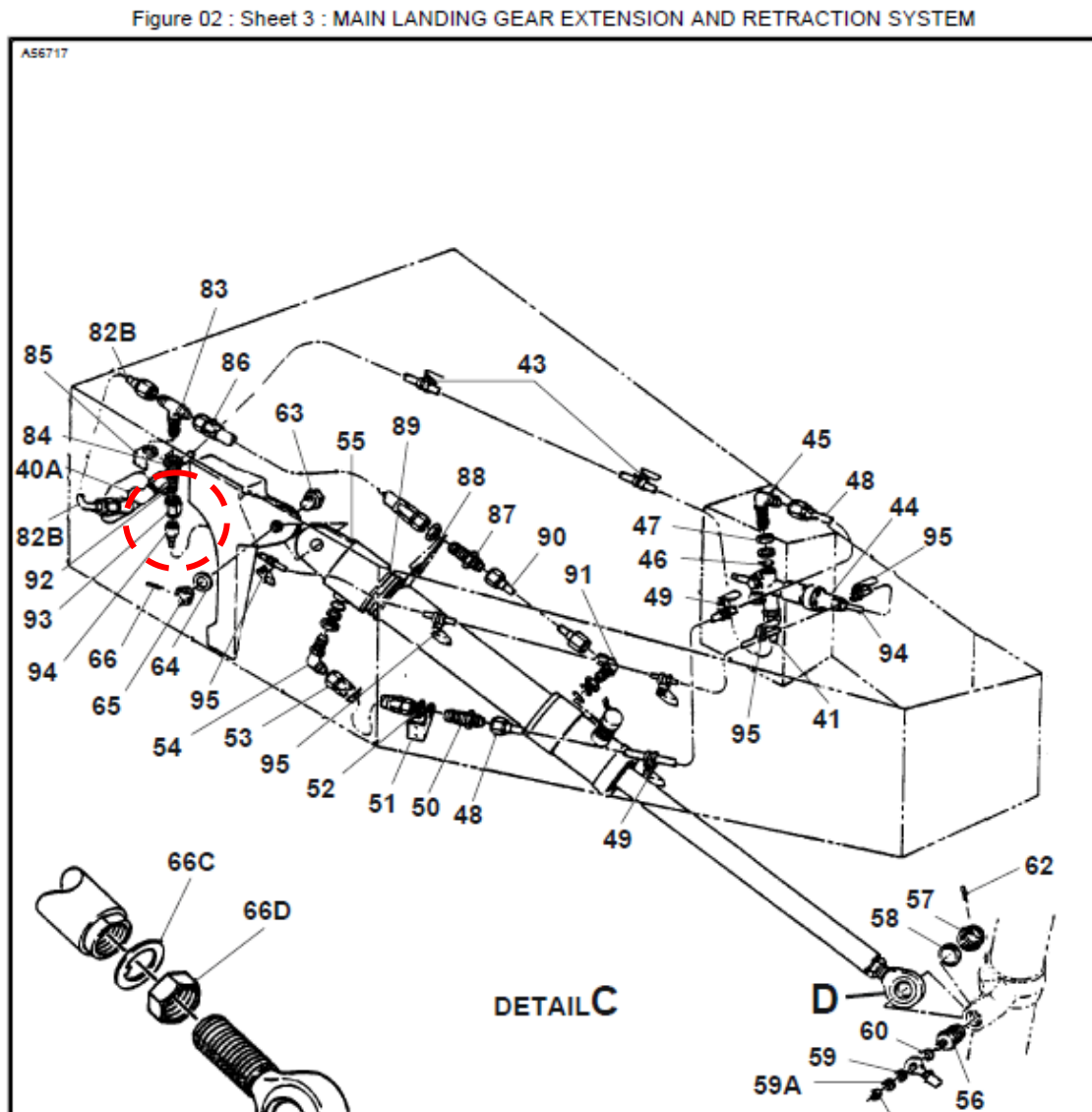


Figure 4 Parts catalogue



LINE ASSY RETRACT LH AND RH			
91	AN833-6D	. ELBOW LH AND RH	2
- 91A	AN6289-6D	. NUT LH AND RH	2
- 91B	MS9058-06	. RING BACK UP LH AND RH	2
- 91C	MS28778-6	. O-RING LH AND RH	2
92	NAS1564-6-4	. REDUCER LH AND RH	2
93	AN818-6D	. NUT COUPLING LH AND RH	2
94	5100111-45	. LINE ASSY LH RETRACT REDUCER TO UPLOCK ACTUATOR	1
- 94A	5100111-46	. LINE ASSY RH RETRACT REDUCER TO UPLOCK ACTUATOR	1
95	MS21919DG4	. CLAMP LH AND RH	10
ATTACHING PARTS			
- 95A	S138-1	. BRACKET	1
- 95B	MS27039-0815	. SCREW	1
- 95C	NAS43DD3-32	. SPACER	1
- 95D	MS21044N08	. NUT	1
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**NOTE 1: AND ALSO INCORPORATING SK421-122**  
- Item Not Illustrated

### 1.13 Medical and Pathological Information

1.13.1 There was no evidence that physiological factors or incapacitation affected the performance of the pilot.

### 1.14 Fire

1.14.1 There was no evidence of pre- or post-impact fire.

### 1.15 Survival Aspects

1.15.1 The accident was considered to be survivable, the aircraft was intact and the damage was limited to the left wing, left propeller and the underbelly.

### 1.16 Tests and Research

1.16.1 None

## **1.17 Organizational and Management Information**

1.17.1 This was a maintenance test flight.

1.17.2 The last annual inspection carried out on the aircraft was certified on 24 July 2014 by an aircraft maintenance organisation (AMO).

1.17.3 The AMO that performed the annual inspection on the aircraft was in possession of a valid AMO approval certificate no.222

## **1.18 Additional Information**

1.8.1 None

## **1.19 Useful or Effective Investigation Techniques**

1.19.1 None

## **2. ANALYSIS**

### **2.1 Man:**

The pilot was appropriately rated on the aircraft type and fit to undertake the flight on the day of the accident.

### **2.2 Machine:**

2.2.1 The aircraft was taken for a test flight, and during final approach the pilot selected the undercarriage down, but there was no “undercarriage down and locked” indication”. The emergency gear down system was then deployed and only the nose and right main gear locked down, but the left main gear did not extend. The pilot reported this to the ATC and requested to do a flypast so that the ATC could check. The pilot did a flypast and the ATC confirmed that the left main gear was not extended. The pilot landed with the nose and right main gear only. Once slowed down the left wing made contact with the runway. The aircraft then veered off the runway to the left because the pilot could not maintain directional control, and came to a stop on the grass left of Runway06 near intersection 06/24 and 11/29.

2.2.2 Investigation revealed that the rigid pipe in the left main wheel well separated from the main landing gear up-lock cylinder and caused the hydraulic fluid to leak. This resulted in the left main gear not extending. All other components were found in place and correctly fitted, but the supporting sleeve at the attachment to the up-lock cylinder was found to be cracked.

### **2.3 Environment:**

Fine weather conditions prevailed during the flight. The weather did not play any role in the sequence of events leading to the accident.

### **3. CONCLUSION**

#### **3.1 Findings**

- 3.1.1 The pilot held a valid Commercial Pilot Licence(CPL) , and the aircraft type rating was endorsed on it.
- 3.1.2 The pilot's medical certificate was valid, with no restrictions at the time of the accident.
- 3.1.3 The aircraft had a valid C of A at the time of the accident
- 3.1.4 The log books show that the aircraft was maintained by an approved AMO, who holds certificate number 222.
- 3.1.5 The left main gear failed to extend even after the emergency gear down system was deployed.
- 3.1.6 The left main gear did not extend due to the rigid pipe in the left main wheel well separating from the main landing gear uplock cylinder and causing the hydraulic fluid to leak again.
- 3.1.7 Weather conditions were fine at the time of the accident.
- 3.1.8 The accident occurred during daylight.
- 3.1.9 On the 21 August 2014 the aircraft was taken to the workshop to repair a hydraulic leak in the left hand main wheel well. The engineer found that a rigid hydraulic line was leaking due to corrosion porosity hidden by a supporting clamp. The rigid line was removed and a new line was made according to F.A.A Advisory Circular AC 43-13(Acceptable methods, techniques and practices- aircraft inspection and repair).

#### **3.2 Probable Cause/s**

- 3.2.1 Forced landing due to the left main gear failure to extend on final approach as a result of the failed rigid hydraulic pipe fitted in the main wheel well.

### **4. SAFETY RECOMMENDATIONS**

- 4.1 None

### **5. APPENDICES**

- 5.1 None