Ministry of Works and Transport

ACCID/06/07/2012/1-4

DIRECTORATE OF AIRCRAFT ACCIDENT INVESTIGATION
ACCIDENT REPORT – EXECUTIVE SUMMARY

Aircraft Registration	**V5 - VVJ**	**Date of Accident**	6 July 2012	**Time of Accident**	15:30 UTC
Type of Aircraft	CESSNA 210L		**Type of Operation**	Charter	
Pilot- In - command License Type	CPL	**Age**	20	**License Valid**	valid
Pilot-In-command Flying Experience	Total Flying Hours	362.2		**Hours on Type**	87.9
Last point of departure	Mushara (Etosha)				
Next point of intended landing	Swakopmund				

Location of the accident site with reference to easily defined geographical points (GPS readings if possible)

5nm East of Swakopmund airport, as S 22° 16' 2 & E 14° 20'

Meteorological Information	Wind: L/V, Wind speed: L/V, Visibility: Good, Temperature: Cloud cover: OVC, Cloud base: 2000 FT, Dew point: Unknown				
Number of people on board	1+4	**No. of people injured**	2	**No. of people killed**	0

Synopsis

According to the pilot, the charter flight was scheduled to depart from FYMO (Mokuti lodge) at 10:00 UTC, however due to the prevailing weather conditions at Swakopmund the flight was delayed, it was decided later that the flight should depart from Mushara a short drive from Mokuti lodge. The flight finally departed from Mushara runway 27 at 12:57 UTC for FYSM (Swakopmund) for an ETA (Estimated Time of Arrival) of 14:52 UTC which translate to approximately a two hour flight.

The flight was uneventful until the commencement of the descent to FYSM (Swakopmund), the pilot stated that the weather was deteriorating from the north which prompted an 180^0 degrees turn for a different approach angle.

According to the pilot after a short conversation with Operators Duty Officer, there was agreement that the pilot should divert to FYAR (Arandis) the alternate airport. After reaching Rossing mountains and descending to 2000ft AGL (above ground level) the pilot made contact with another aircraft with registration V5-AUA and after a conversation with the pilot she then reversed her decision and continued back to Swakopmund.

Just beyond 5nm inbound to FYSM, the engine stopped and according to the pilot, her efforts to restart the engine remained futile despite alternating the different fuel tanks.

The aircraft impacted the ground at around 15:35 UTC as a result sustained substantial damage. The pilot and the passenger on the right seat sustained minor injuries.

The local police were contacted by the Scenic Air management who later arrived to cordon off the crash site, the DAAI (Directorate of Aircraft Accident Investigations) were contacted by Scenic Air Management and the two Investigators arrived at the scene the following morning. No other representatives were invited for the investigations.

The pilot was a South African National, holder of a valid South African Commercial Pilot License with Instrument and Night rating and was flying with a Namibian Validation. Her medical certificate was valid with no restrictions. The aircraft type was endorsed in her license.

The last Mandatory Periodic Inspection (MPI) was certified on 9 May 2012 at 9081.0 airframe hours. At the time of the accident the aircraft had accumulated a further 55.6 hours since the last MPI was certified.

According to the records, the Aircraft Maintenance Organization (AMO) that certified the last MPI on the aircraft prior to the accident was in possession of a valid AMO Approval valid until 29 November 2012. The Regulatory Authority conducted an audit on the AMO at Eros Airport on the 29th Nov 2011. All Airworthiness Directives (AD) and Service Bulletins (SB) were complied with as certified in the last MPI dated 9 May 2012.

Probable Cause: Human Error

Contributing factor (s):
1.Fuel mismanagement
2.Improper flight planning
3.Deviation from regulations and SOPs
4.Improper oversight

AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator	**: Scenic Air**
Manufacture	**: Cessna**
Model	**: 210L**
Nationality	**: Namibian**
Registration	**: V5 - VVJ**
Place	**: Swakopmund**
Date	**: 6TH July 2012**

All times given in this report are in Co-ordinated Universal Time (UTC).

Purpose of the Investigations:

In terms of ICAO Annex 13, this report was compiled in the interest of the promotion of aviation safety and the reduction of risk of aviation accident or incidents and **not to establish legal liability.**

This report contains fact relating to aircraft accidents or incidents which have been determined at the time of issue. The report may therefore be revised should new and substantive facts be made available to the investigator (s).

1. FACTUAL INFORMATION

1.1 History of Flight

1.1.1 According to the pilot, the charter flight was scheduled to depart from FYMO (Mokuti lodge) at 10:00 UTC, however due to the prevailing weather conditions at Swakopmund the flight was delayed, it was decided later that the flight should depart from Mushara a short drive from Mokuti lodge. The flight finally departed from Mushara runway 27 at 12:57 UTC for FYSM (Swakopmund) for an ETA (Estimated Time of Arrival) of 14:52 UTC which translate to approximately a two hour flight.

1.1.2 The flight was uneventful until the commencement of the descent to FYSM (Swakopmund), the pilot stated that the weather was deteriorating from the north which prompted an 180^0 degrees turn for a different approach angle.

1.1.3 According to the pilot after a short conversation with Operators Duty Officer, there was agreement that the pilot should divert to FYAR (Arandis) the alternate airport. After reaching Rossing mountains and descending to 2000ft AGL (above ground level) the pilot made contact with another aircraft with registration V5-AUA and after a conversation with the pilot she then reversed her decision and continued back to Swakopmund.

1.1.4 Just beyond 5nm inbound to FYSM, the engine stopped and according to the pilot, her efforts to restart the engine remained futile despite alternating the different fuel tanks.

1.1.5 The aircraft impacted the ground at around 15:35 UTC as a result sustained substantial damage. The pilot and the passenger on the right seat sustained minor injuries

conditions at a position recorded as S 22° 16’ 2 & E 14° 20’.15H35 UTC. Daytime.

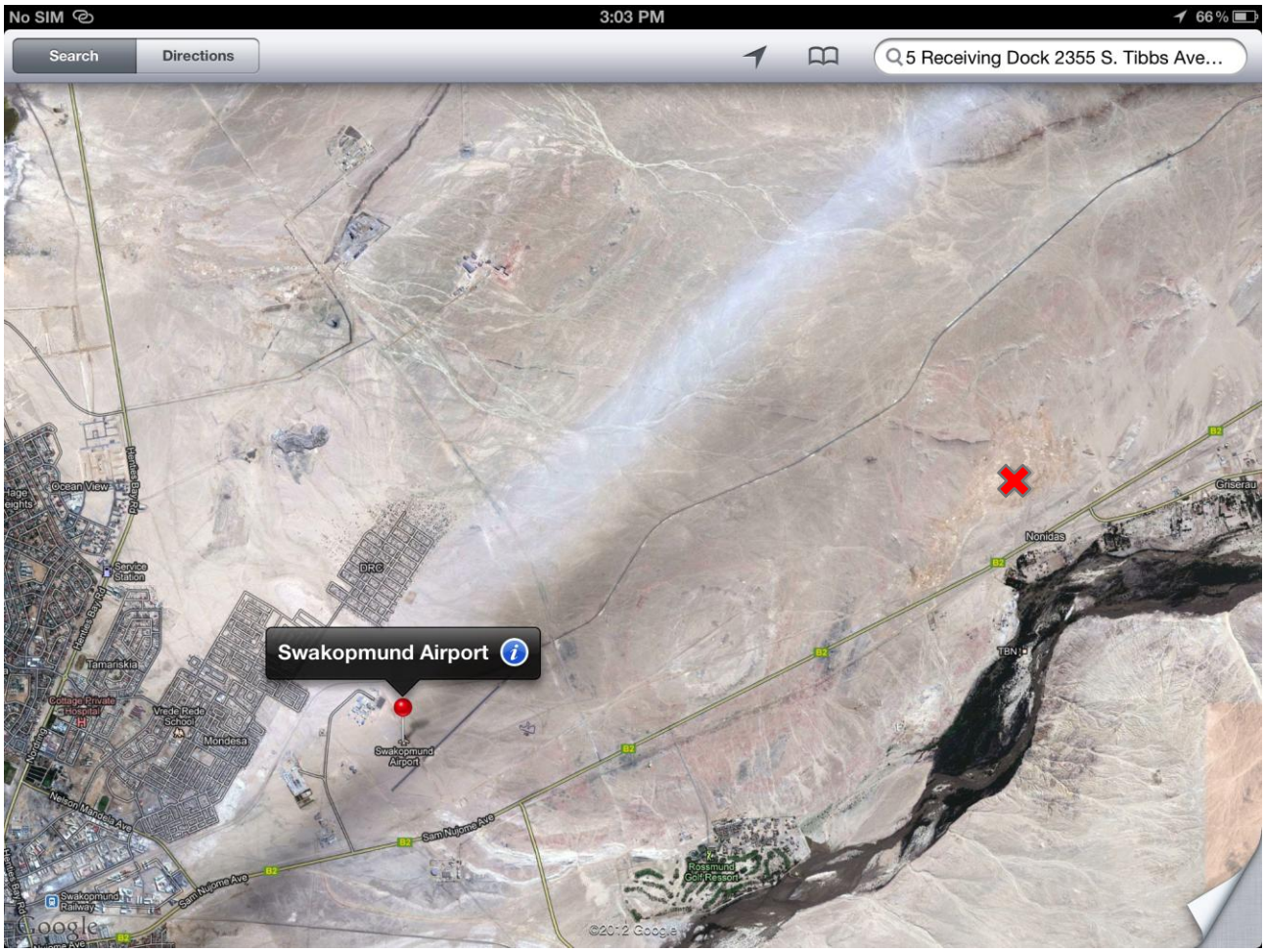

Figure 1: Aerial view of the area where the accident occurred

✘- Accident site (North of Nonidas.)

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	1	-	1	-
None	-	-	3	-

1.3 Damage to Aircraft

1.3.1 The aircraft was destroyed.

Figure 2: View of the wreckage after the accident

1.4 Other Damage

1.4.1 There was no other damage

1.5 Personnel Information

1.5.1 Pilot-in-in command

Nationality		South African			
Licence No	0272342320	Gender	Female	Age	20
Licence valid		Yes	Type Endorsed	Yes	
Ratings		Night flying, Instrument			
Medical Expiry Date		31 January 2013			
Restrictions		None			
Previous Accidents		Unknown			

NB. The pilot was flying under Namibian validation, valid until 17/08/2012

Flying Experience:

Total Hours	362.2
Total Past 90 Days	82.7
Total on Type Past 90 Days	82.7
Total on Type	87.9

1.6 Aircraft Information

Airframe:

Type	Cessna 210L
Serial No.	21061520
Manufacture	Cessna Aircraft Corp
Year of Manufacture	1976
Total Airframe Hours (At time of Accident)	9136.6
Last MPI (Date & Hours)	9 May 2012 at 9081.0 airframe hours
Hours since Last MPI	55.6 hours
C of A (Issue Date)	1 March 2012
C of R (Issue Date) Present owner	14 Feb 2012
Operating Categories	Standard Part 135

Engine:

Type	IO-520-L-17B
Serial No.	294549-R
Hours since New	3286.1
Hours since Overhaul	1247.9

Propeller:

Type	Hartzell PHC-J3YF-IRF/F7691
Serial No.	FP2796B
Hours since New	3775.6
Hours since Overhaul	1376.7

Fuel

Type	Avgas
Fuel on Board	Fuel tanks were ruptured during the accident sequence
Fuel distribution	No fuel observed on strainer bowl, electric fuel boost pump or in fuel lines during the investigations.

1.7 Meteorological Information

The following weather information was obtained from the pilot's Questionnaire.

Wind direction	L/V	Wind speed	L/V	Visibility	>10 km
Temperature	Not given	Cloud cover	OVC	Cloud base	2000ft
Dew point	Not given				

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigation equipment.

1.9 Communications.

1.9.1 There was no reported communication problem between the pilot and the air traffic controller who handled the flight.

1.10 Aerodrome Information

Accident Site Location	5nm from Swakopmund airport, north of Nonidas
Accident Site Co-ordinates	S22.162, 14.2 E
Accident Site Elevation	132 ft AMSL
Accident Site Surface	Rocky, sandy surface

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 by the relevant aviation regulations.

1.12 Wreckage and Impact Information

The impact occurred in a westerly direction, with a high rate-of-decent in a nose-down attitude whilst in a slight left-hand turn. The initial impact marks of the left wing tip were approximately 32m from the main wreckage.

Figure 3: initial impact on the left wing followed by propeller contact with the ground catapulting the aircraft on a 180º spin.

Fig 4: final resting space about 32m from initial point of impact.

Figure 5: The right hand seat detached on impact from the rail and later removed from the aircraft when rescuing the passenger.

Fig 6: The Propeller hub detached on impact as the engine absorbed most of the impact.

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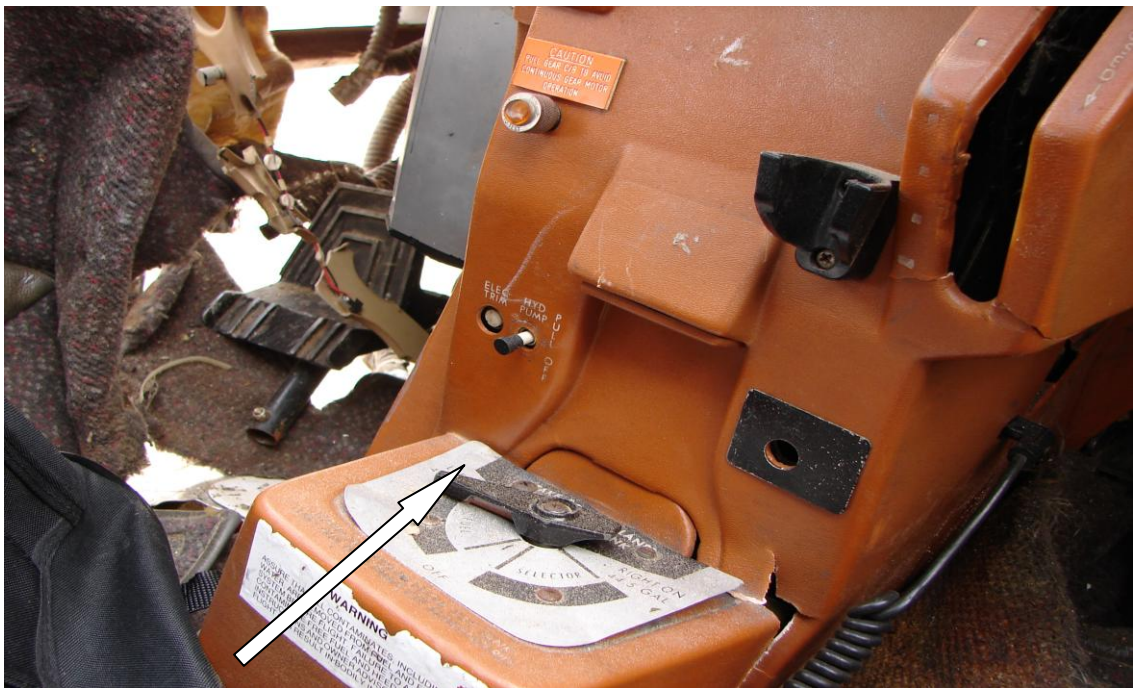


Fig. 7.
Fuel selector valve changed to the left tank after engine stopped.

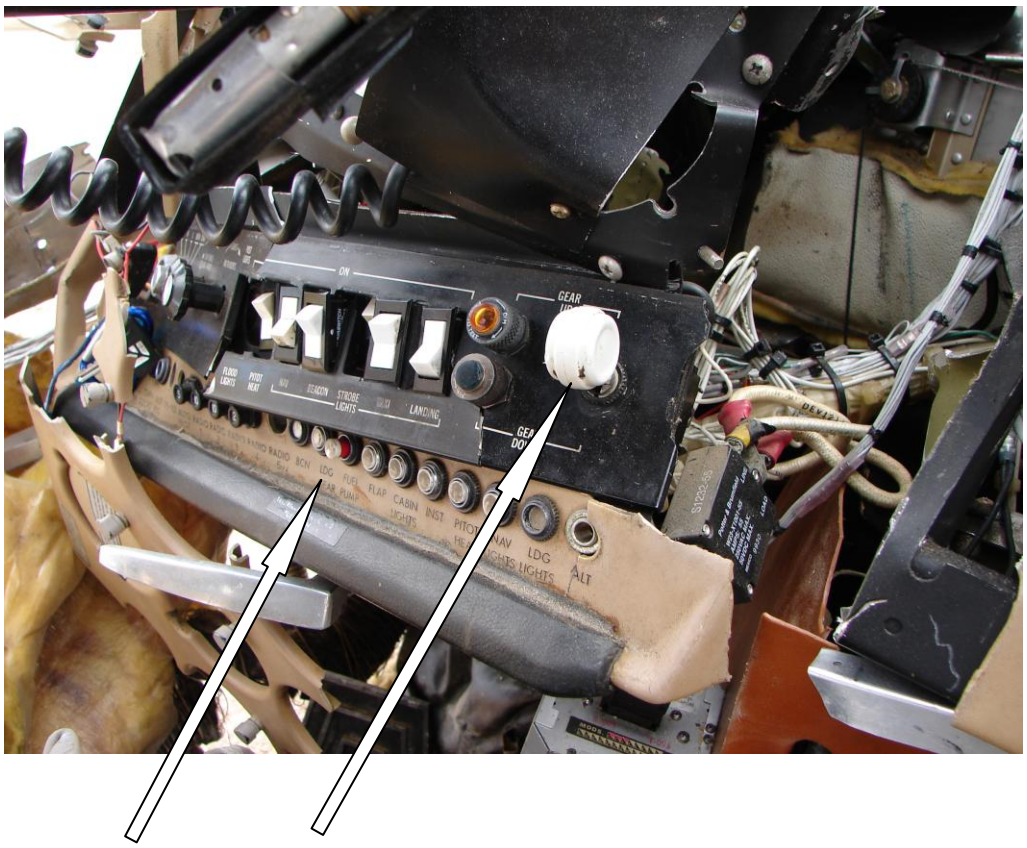


Fig 8. Landing gear selector lever still set to up.
Fuel pump CB (circuit breaker) popped out due to pump running dry.

1.13 Medical and Pathological Information

1.13.1. Not conducted

1.14 Fire

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

1.15 Survival Aspects.

1.15.1 The pilot occupied the left-hand seat and the passenger on the front right -hand seat were both injured while the rear seats occupants were uninjured.

1.15.2 The right hand seat detached from the seat rail.

1.15.3 There were safety harnesses on all seats and none of these failed.

1.16 Tests and Research.

1.16.1. The engine was extremely damaged and could not be function tested.The fuel bowl strainer was removed from the airframe and it was noted that there were no fuel present in the bowl.

1.16.2. The electric fuel boost pump was also removed and no fuel was found present at the fuel lines of the boost pump.

1.16.3 The fuel selector was function checked and found operational. (see appendix 2)

1.16.4. A flight training performance research was carried out to determine any training anomalies. This included Ab-initial training, commercial and validation training through various training schools.

1.17 Organizational and Management Information.

1.17.1. The aircraft belongs to O+H Aviation and had been operated by Scenic Air.

1.17.2 The operator was in possession of a valid Part 135 Air Operator Certificate (AOC), issued on 2 Feb 2012.

1.17.3 The Aircraft Maintenance Organization (AMO) responsible for the last MPI was duly certified to carry out the required maintenance on the aircraft and was in possession of a valid AMO certificate No. 74 Valid till 29 November 2012.

1.18 Additional Information

1.18.1 Not applicable

1.19 Useful or Effective Investigation Techniques

1.19.1 Not applicable

2. ANALYSIS

2.1. The charter flight was scheduled to commence from Etosha for Swakopmund with the alternate as Arandis aerodrome. After a delay due to weather at Swakopmund, the flight was rescheduled and finally departed from Mushara runway 27 at 12:57 UTC. During approach for landing on runway 24 at Swakopmund, the aircraft had a complete engine shutdown before crashing shortly after.

2.2. The pilot as well as the passenger sitting on the front right seat sustained injuries, the pilot's injuries were as a result of hitting the instrument panel.

2.3 The accident was survivable, though proper aircraft configuration for landing could have caused the under-carriage to absorb most impact forces and reduce the damage to the fuselage.

2. 4. The pilot was licensed and rated on the aircraft type to conduct the flight and was the holder of a valid medical certificate.

2. 5. The aircraft was equipped with standard navigation- and communicational equipment as per the minimum equipment list approved by the regulator for the aircraft type.

2.6 The aircraft was not equipped with a flight data recorder or a cockpit voice recorder nor was it required by the relevant aviation regulations.

2.7 The operator was in possession of a valid Part 135 Air Operator Certificate (AOC), issued on the 2nd Feb 2012, and valid until 2 Feb 2013.

2.8 The Aircraft Maintenance Organization (AMO) that carried out the last scheduled M.P.I was duly certified to carry out the required maintenance on the aircraft and was in possession of a valid AMO certificate valid till 29 November 2012.

3. CONCLUSION

3.1 Findings

3.1.1 Examination of the aircraft flight log, fuel log and manifest indicated that not all entries were consistent with the operator's procedures. The mass and balance sheet basic principles were not adhered to adequately as the C.O.G (centre of gravity) was close to the margin on take-off and shifted progressively as fuel burned off. Fuel log calculations as documented by the pilot did not demonstrate acceptable level of management technique. (see appendix 1).

3.1.2 Pilot started off on flight reversing the quantities of fuel in tanks on her flight log. Wrong quantity was burn on time basis. However after dipping at Mushara the pilot realized the problem and started doing her calculations correctly. However she decided to rectify fuel imbalance on which she flew 50 min leg instead of 30 min to get balance back. In sector III she had flown only 20 min because of low fuel tank. The last fuel switch was at 14.43 UTC before the decent. Having flown, descended and diverted before turning back to Swakopmund with 55 lts in right tank, sector IV took ±52 min before the engine stopped due to fuel starvation.

3.1.3 Flight log showed poor fuel management planning and fuel timing on actual figures. A lack of understanding in the principal of fuel used on a time /distance/actual is evident in the paperwork recorded by the pilot. During investigations interviews the Pilot could not give a good explanation of the fuel management system she used.

3.1.4 Training records revealed significant deficiency in flight management command, the PPL (Private Pilot license) progress report acknowledges that the pilot had difficulty in implementing decisions when experiencing high workloads, and tend to “lose focus on the task at hand”. These sentiments reverberate through all phases of the training. In a particular instance the records indicate a ‘below standard’ score grade on the Flight Performance aspect.

3.1.5 The investigations revealed that the company’s Line training identified the existing deficiencies as known during her training; however no proper action was taken to address the shortcoming.

3.1.6 The DE (Designated Examiner) for the pilot initial validation test affirmed of fundamental errors and omissions during her check flight which were not consistent with a Commercial Pilot License holder which were recurrent and thereby refused to sign her out. The DE further reiterated that he felt at the time that the pilot was not yet ready to fly alone.

3.1.7 Investigations revealed that the SOPs (Standard Operating Procedures) were not followed with regards to aircraft configuration on forced landing as well as briefings to passengers on the emergency.

3.1.8 There were recurring defects that were recorded, the investigations noted more than 10 instances of CHT (cylinder heat temperature) defects logged on flight folio within a 4 months period.

3.1.9 Fuel feeding concerns were raised and recorded on the aircraft’s flight folio, however there was evidence that it was adequately addressed.

3.1.10 There were no maintenance agreement contracts with some subcontractors who performed regular maintenance.

3.1.11 Investigations further revealed that certification oversight was not sufficient on the validation process of the pilot license.

3.1.12 The tourism industry is a highly sensitive industry and requires a high level of competency and consequently only pilots who demonstrate the highest professional aptitude should be allowed to partake in this volatile and important sector

3.2 Probable Cause/s

3.2.1. Human error.

3.3 Contributing factor/s

3.3.1 Fuel mismanagement.
3.3.2 Improper flight planning.
3.3.3 Deviation from regulations and SOPs.
3.3.4 Improper oversight

4 SAFETY RECOMMENDATIONS

In the interest of Aviation Safety, it is recommended that

4.1 The operator should make use of a training instructor who will identify specific deficiencies of individual pilots and devise methods of bridging their explicit shortcomings.

4.2 The Operator QA (Quality Assurance) system should have greater oversight on maintenance by periodically reviewing defects and deferred defects to identify adverse trends. The Safety Analyst/Manager has the responsibility for developing metrics to identify safety trends that facilitate effective risk mitigations and controls.

NB: It should be noted that, though one can outsource/subcontract maintenance functions thereby delegating responsibility, one **CANNOT consequently delegate accountability**. Although maintenance was not a factor in this accident, the operator remains accountable to the ensuring defects and the maintenance schedule is effectively carried out.

4.3 The Authority should look into manning the busy Swakopmund airport.

4.4 The Authority should strengthen the process of certifying and verification of licenses.

4.5 The tourism industry is a highly sensitive industry and requires a high level of competency and therefore only pilots who demonstrate the highest professional aptitude should be allowed to partake in this volatile and important sector.

Compiled by: Date: 4 FEB 2014

Hafeni Mweshixwa
Investigator – in – Charge

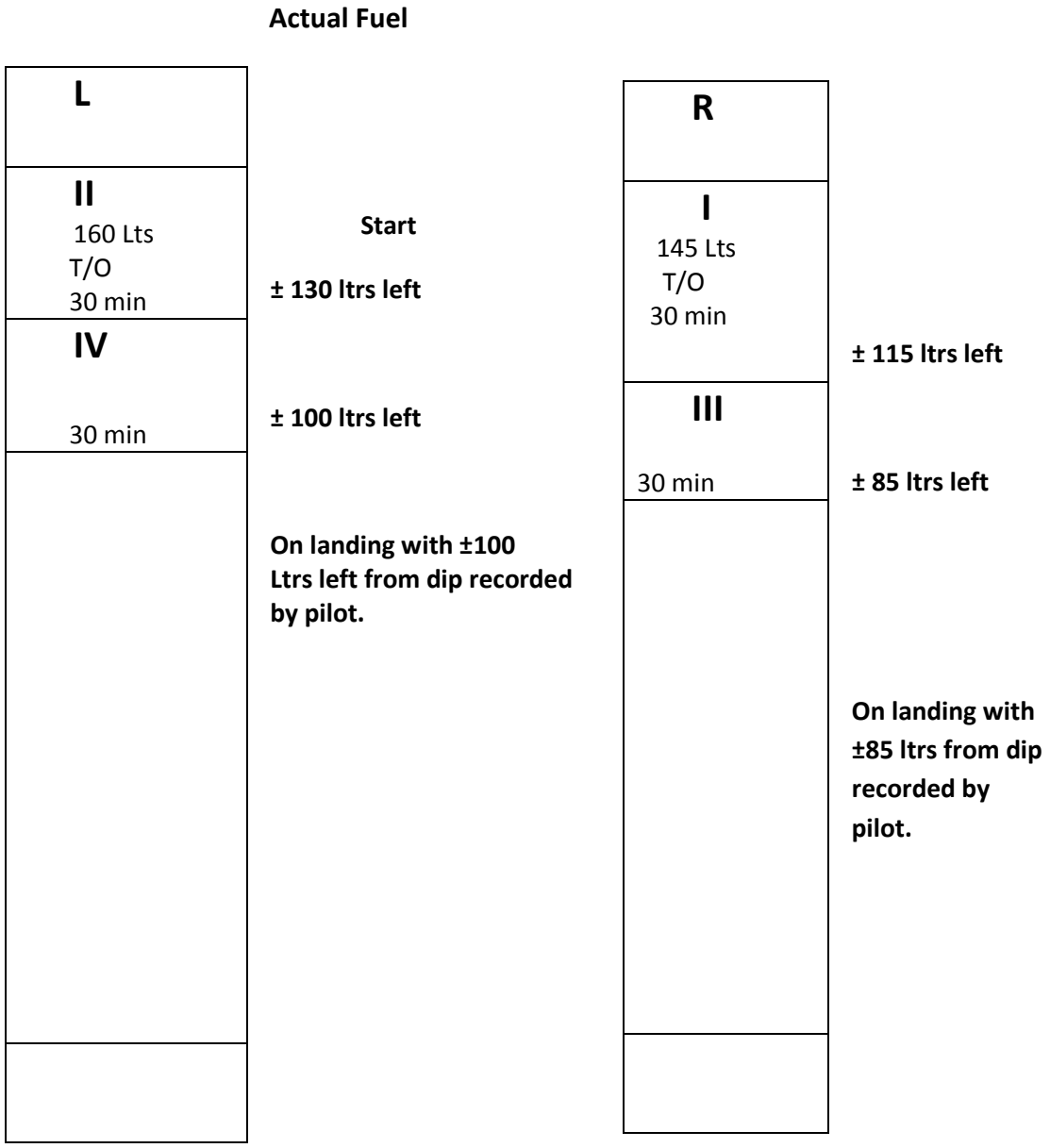
Released by: Date: 04/02/2013

Erkki Nghimitina (MP)
MINISTER: MINISTRY OF WORKS AND TRANSPORT

Ministry of Works and Transport
04 FEB 2013
Office of the MINISTER

Appendices 1

Graphical illustration of fuel management on the outbound leg. (Swakopmund-Mushara.)



Start up at 10:03

Shut down 12:23

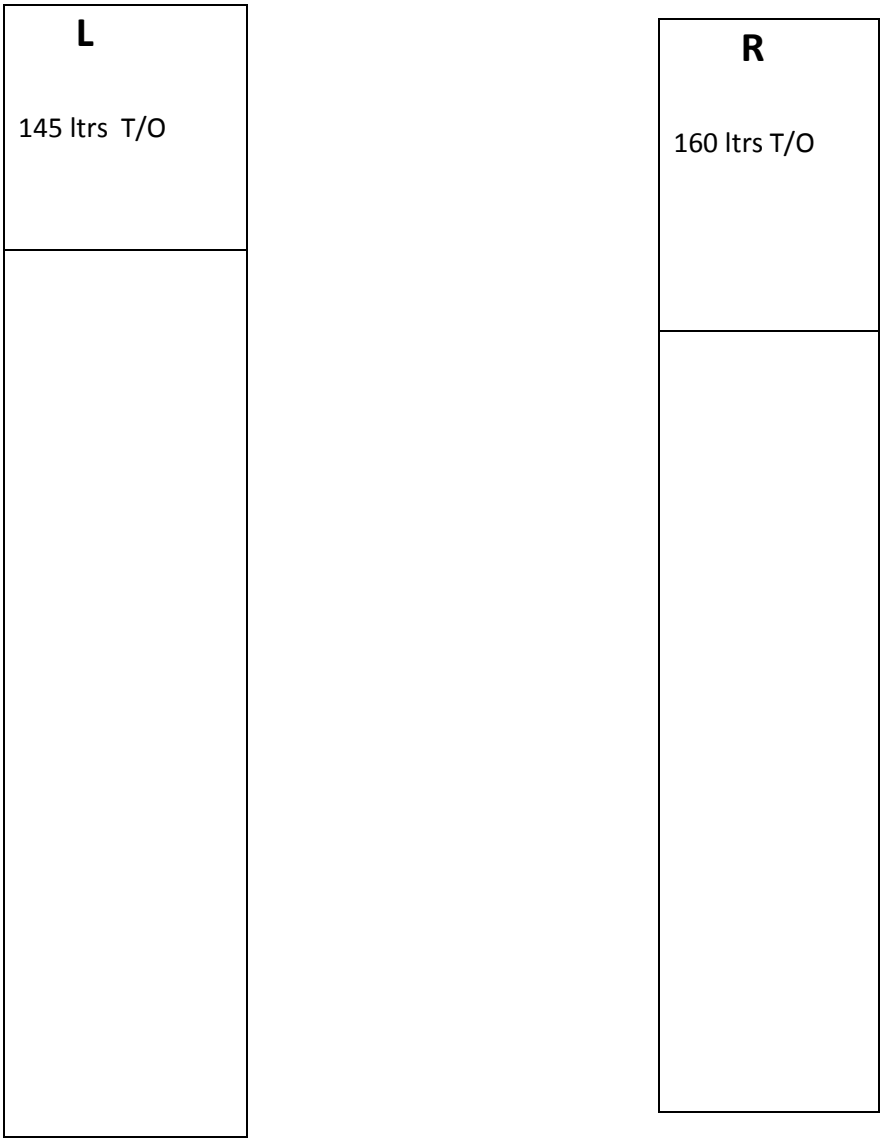
Flight time 2.20

Actual fuel used 115 Ltrs on flight log by dipping method- Pilot confirms.

Take-off Swakopmund : 305 ltrs both tanks.

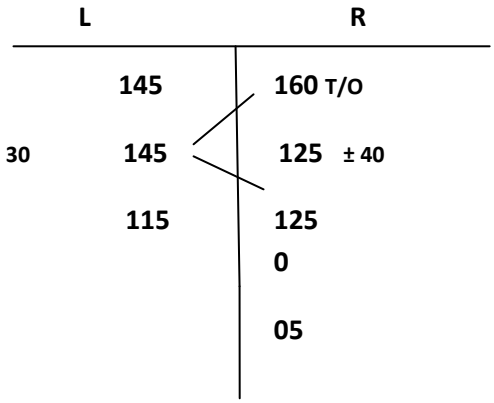
Land Mushara: 185 lts both tanks.

V5 – VVJ. Pilot version of fuel management (Swakopmund-Mushara.)



Pilot switch fuel actual quantities around wrongly on take-off from Swakopmund to Mushara as recorded in flight folio by pilot.

Sample of Pilot fuel management version on log.

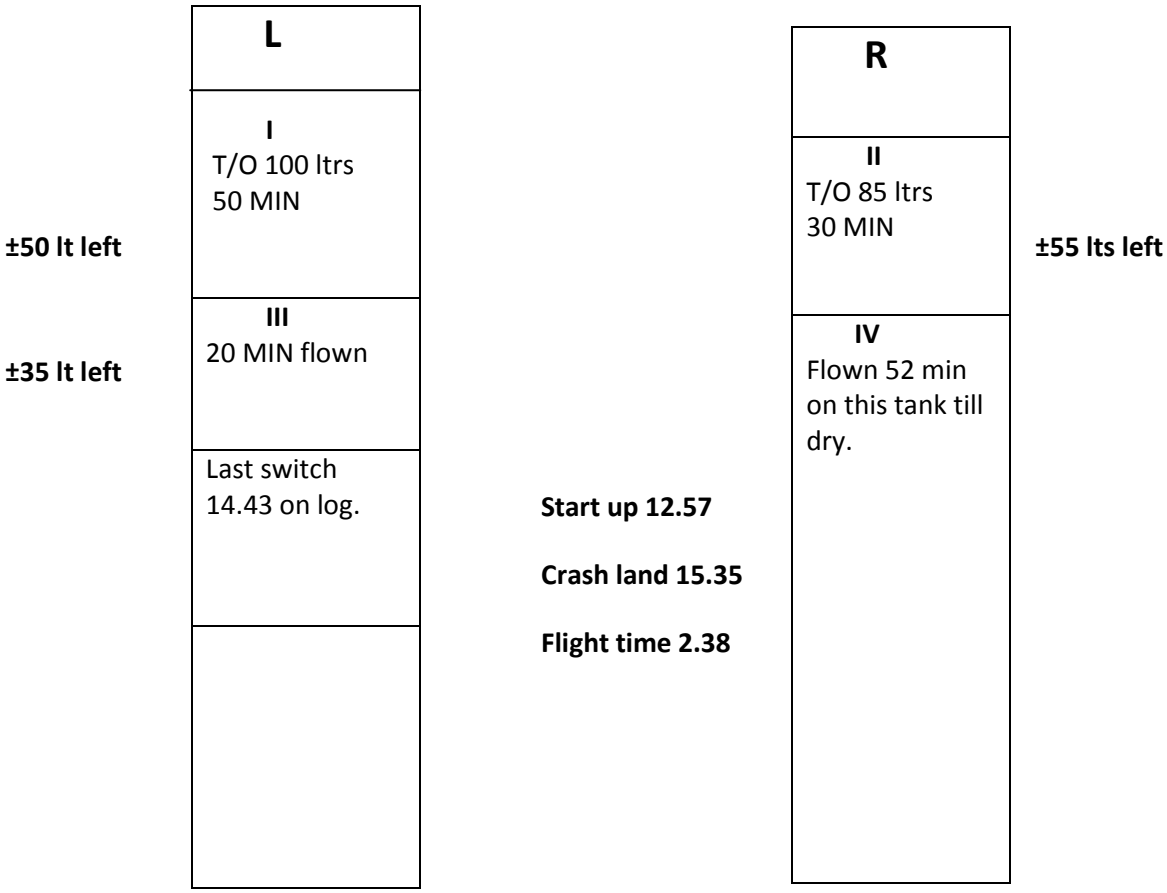


Sample of flight log for fuel management on flight folio.

L	R
300	300
300	225
300	225
300	150

Graphical illustration of fuel management on inbound leg.

ACTUAL FUEL



- **Pilot admit about 30 l/tank in interview. ETA for SWP 14.52. Crash 43 min after ETA in reserve Switch to right tank after failure/Photo evidence**

TRIP FUEL	**SM-MN-SM**
Take off Total Fuel 305 lt	±305 min @ 55 lt ph = 5h 05 minutes.
Flight time x 4 h 58 @ 55 lt ph	= 275 lt
Fuel available in left tank	30 lt
	305 lt
Total flight time was 4 hrs 58 @ 55 lts p/h	275 Ltrs.