

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8896	
Aircraft Registration	ZS-HWR	Date of Accident	20 February 2011		Time of Accident	1425Z
Type of Aircraft	Enstrom 280 FX Helicopter		Type of Operation		Private	
Pilot-in-command Licence Type		Private Pilot	Age	55	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	293,0		Hours on Type	104,1
Last point of departure		Kitty Hawk Aero Estate Airstrip (FAKT)				
Next point of intended landing		Kitty Hawk Aero Estate Airstrip (FAKT)				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
Open stretch of veld on southern side of Kitty Hawk Aero Estate Airstrip at GPS co-ordinates S25°24 45.2 E028°17 30.9.						
Meteorological Information		Temperature: 25°C; Visibility and clouds: CAVOK.				
Number of people on board	1 + 1	No. of people injured	0	No. of people killed	0	
Synopsis		<p>The pilot, accompanied by a passenger, was engaged on a private flight from Kitty Hawk Estate Airfield. During the flight, the engine spluttered and suddenly lost power. The pilot began executing an autorotation emergency landing on an open stretch of veld, flaring the helicopter prior to touchdown. The aircraft landed hard and rolled over onto its right side, sustaining substantial damage. Neither pilot nor passenger suffered any injury, however.</p>				
Probable Cause						
<p>Unsuccessful autorotation landing after a loss of engine power in flight.</p>						
IARC Date				Release Date		

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The helicopter was substantially damaged in the accident. The main rotor blades struck the tail boom during the landing sequence, severing the boom and tail rotor assembly. The fuselage also sustained damage after rolling onto its side, and the main rotor, skids and windscreen were destroyed.



Figure 1, The wreckage of the helicopter.

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	55
Licence Number	0271012205	Licence Type	Private Pilot		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Flight Tests – Single-engine Piston				
Medical Expiry Date	31 January 2012				
Restrictions	Corrective lenses				
Previous Accidents	15 March 2003: Thunderbird MKII aircraft. Pilot performed a forced landing after an engine failure in flight. The nose wheel assembly broke off on touchdown.				

Flying Experience

Total Hours	± 293,3
Total Past 90 Days	0,6
Total on Type Past 90 Days	0,6
Total on Type	104,1

1.6 Aircraft Information

Airframe

Type	Enstrom 280 FX Helicopter	
Serial Number	2035	
Manufacturer	The Enstrom Helicopter Corporation	
Year of Manufacture	1989	
Total Airframe Hours (at time of accident)	1 586,5	
Last MPI (Date & Hours)	26 November 2010	1 585,9
Hours since last MPI	0,6	
C of A (Issue Date)	3 December 2010	
C of R (Issue Date) (Present Owner)	1 December 2003 Rotor Craft Services CC	
Operating Categories	Standard	

Engine

Type	Textron Lycoming HIO 360 F1AD
Serial Number	L-25016-51A
Hours since New	1 586,5
Hours since Overhaul	102,9

1.6.1 According to the aircraft file, the helicopter was inspected by the SACAA on 1 December 2010 in order to re-issue the Certificate of Airworthiness (C of A).

1.6.2 All the aircraft documentation was valid and in compliance with applicable regulations.

- 1.6.3 According to the aircraft file, the helicopter had no record of major defects or damage prior to the accident. It was imported as a new product with its engine (S/N L-25016-51A) installed. The engine was removed for an overhaul inspection at an approved engine overhaul facility after it had accumulated 1 483,0 hours (inspection due at 1 500 hours). It was then re-fitted, subjected to ground-run checks, certified as serviceable, and released to service on 5 April 2006.
- 1.6.4 A mandatory periodic inspection (MPI) of the helicopter was certified on 7 October 2009. After the MPI, the aircraft flew only 0,7 hours when an engine defect, related to the electric fuel booster pump (S/N 20102), was reported. This was rectified and an engine ground-run carried out. No further abnormalities were identified.
- 1.6.5 The last MPI of the helicopter was carried out on 26 November 2010. The engine's total time since overhaul (TTSO) until the MPI was 102,9 hours . In addition to the normally required inspections, the engine was replenished with fresh oil and a filter, and had its spark plugs cleaned and magneto serviced. After the MPI, the engine was ground-run and the helicopter taken on a performance acceptance flight. The engine operation was pronounced satisfactory and the helicopter released to service. It flew 0,6 hours after the MPI before being involved in the accident.
- 1.6.6 The helicopter was last refuelled at Grand Central Aerodrome, uplifting a sufficient quantity of fuel for the flight.

1.7 Meteorological Information

- 1.7.1 The weather information below was obtained from the pilot's questionnaire.

Wind direction	01°	Wind speed	Unknown	Visibility	Good
Temperature	25°C	Cloud cover	CAVOK	Cloud base	CAVOK
Dew point	Unknown				

1.8 Aids to Navigation

- 1.8.1 The helicopter was installed with standard navigation equipment approved for the type. Additional navigation instrumentation – included on the approved equipment list – were also installed. The pilot reported that all the navigation equipment was serviceable.

1.9 Communications

- 1.9.1 The helicopter was operated in uncontrolled airspace. The pilot was required to broadcast his intentions in the area on VHF frequency 120.65 MHz.
- 1.9.2 The helicopter was fitted with VHF radio communication equipment, which was determined to be in a serviceable condition.

1.10 Aerodrome Information

1.10.1 The accident took place outside the boundaries of an aerodrome or heliport. The pilot landed on an open, grassy stretch of veld. The elevation of the landing zone was approximately 4 586 ft above mean sea level (AMSL). The accident site was at the GPS co-ordinates S25° 24 45.2 E028° 17 30.9.

1.11 Flight Recorders

1.11.1 The helicopter was not fitted with a flight data recorder or cockpit voice recorder. Neither was required by regulations.

1.12 Wreckage and Impact Information

1.12.1 The pilot flew the helicopter on a private flight in the area of Kitty Hawk Aero Estate Airstrip. The pilot was flying in southerly direction when a sudden loss of engine power led to an autorotation emergency landing on an open stretch of veld on the southern side of the airfield.

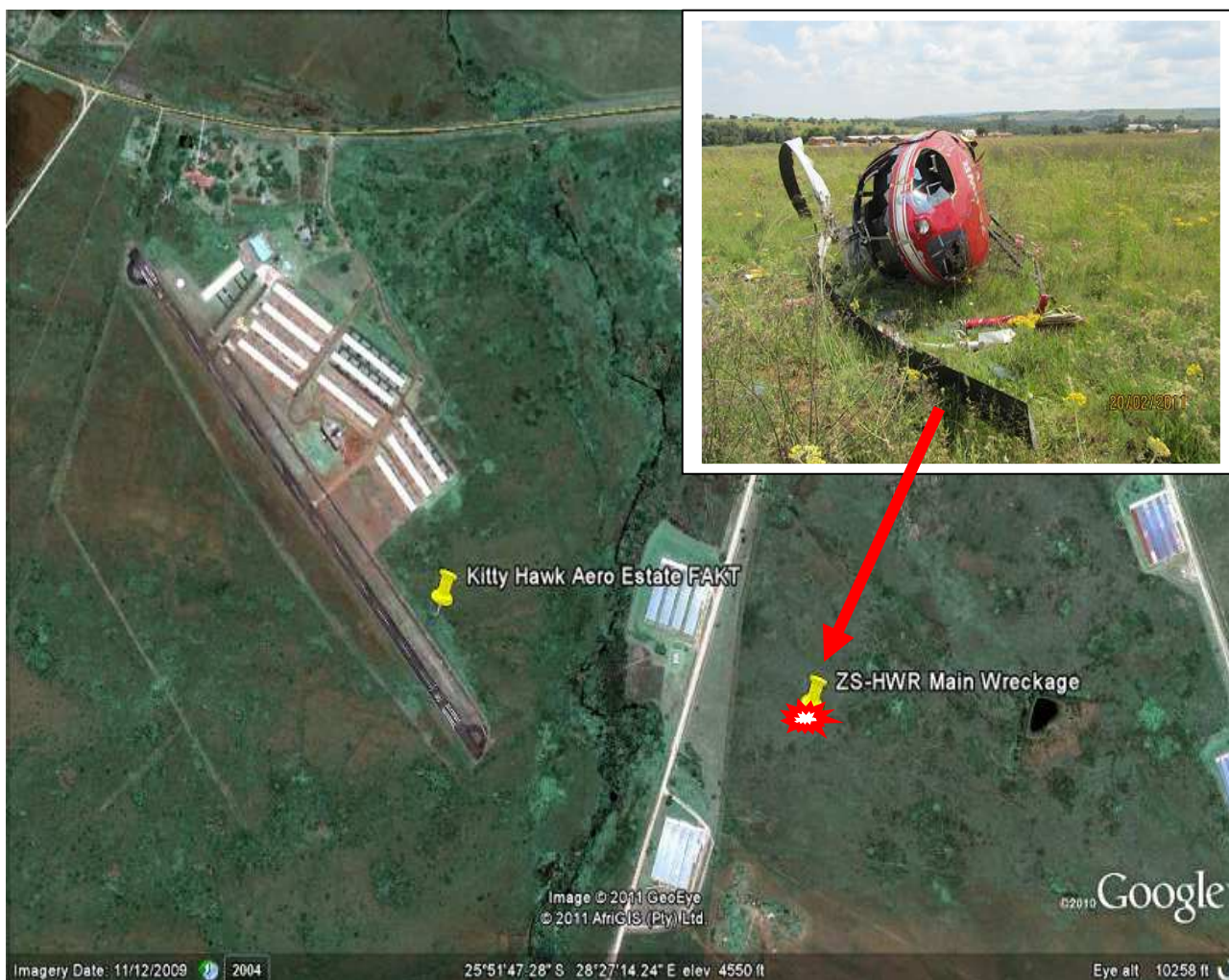


Figure 2. The location of the accident site.

1.12.2 The helicopter sustained substantial damage in the accident. The evidence shows that the main rotor blades struck the tail boom during the landing sequence, severing the section of the boom containing the tail rotor assembly. The tail rotor drive shaft, control cables and electrical wires in the boom were damaged. The helicopter rolled over onto its right side about 50 m from the point of first impact.



Figure 3. The severed tail boom.

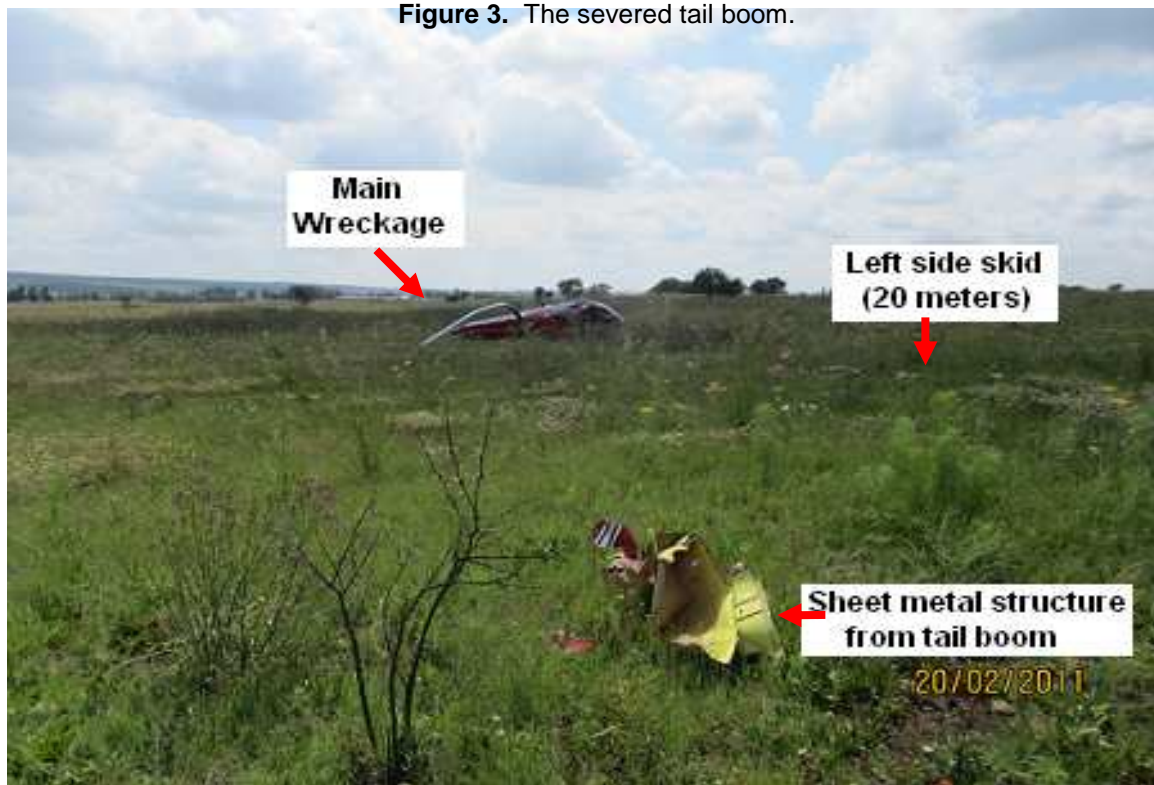


Figure 4. Debris from the wreckage.

1.12.3 The helicopter ended up facing in the opposite (northerly) direction of the initial flight path. The tail rotor assembly had broken off from the rotor shaft and separated from the boom assembly as a result of the main rotor striking the boom. The tail rotor itself was found near the nose section. The left skid was approximately 20 m from the main wreckage. A piece of sheet metal structure from the tail boom was found about 30 m from the main wreckage.

1.12.4 It was concluded that after the left skid broke, the airframe initially struck the ground on its lower left side, then spun on the ground, toppling over onto its right side and ending up facing the opposite direction.

1.13 Medical and Pathological Information

1.13.1 None.

1.14 Fire

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

1.15 Survival Aspects

1.15.1 The accident was considered to be survivable. The cockpit and cabin area remained intact, and the pilot and passenger were properly restrained with safety belts and harnesses. Both occupants evacuated from the wreckage unassisted and did not sustain any injuries.

1.16 Tests and Research

1.16.1 The wreckage was recovered to Kitty Hawk for examination to determine the cause of the loss of engine power. Due to the fact that the engine had sustained only minor damage, it was possible to carry out a ground-run test without removing it from the wreckage. This was executed at various power settings up to maximum to verify performance. No anomaly could be identified to explain the power loss during flight.

1.16.2 The right-hand fuel tank was full, and was drained to check for contamination. None was found. The left-hand fuel tank was empty, as fuel had been used up during the flight. The helicopter was refuelled to do the engine ground-run.

1.17 Organisational and Management Information

1.17.1 The helicopter was operated in the General Aviation sector in accordance with Part 91 requirements.

1.17.2 The helicopter was maintained by a South African-approved aircraft maintenance organisation (AMO), in accordance with CAR Part 145. The AMO had a valid approval certificate and was authorised to carry out maintenance on the type.

1.18 Additional Information

1.18.1 None.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

- 2.1 On the day of the accident, the pilot flew the helicopter on two uneventful, private, VFR pleasure flights, in both cases accompanied by a passenger. The flights involved taking off from Kitty Hawk Estate Airfield, flying a circuit in the area and landing back at the airfield. The helicopter then took off again for a third time, once more carrying a passenger, but as it was gaining altitude, the engine abruptly spluttered and a loss of power occurred. The pilot immediately decided to execute an autorotation emergency landing, identified an open stretch of veld and lowered the collective pitch lever to prepare for the autorotation. He then increased the collective pitch level and flared the helicopter (nose section raised up slightly) to provide sufficient rotor RPM to cushion the touchdown.
- 2.2 The pilot had a valid private pilot's licence and the aircraft type rating was endorsed on it. He also had a valid Class 2 aviation medical certificate with no waivers. The pilot had no medical condition which prevented him from flying on the day. He was also the owner of the helicopter, which he operated privately in the GA sector in accordance with the requirements of Part 91.
- 2.3 The pilot operated the helicopter from Kitty Hawk Estate Airfield. The flights flown were predominantly in the surrounding area, returning to the airfield. The pilot was fairly familiar with the environmental conditions at Kitty Hawk, and had a good idea of the locations of various hazards. It would therefore have been relatively easy for him to select the open stretch of veld for the emergency landing. The surface of the ground was flat, making it ideal for an autorotation landing.
- 2.4 The pilot conducted pre-flight and after-flight inspections prior to proceeding with each of the three flights. He did not observe anything untoward and was confident that the helicopter was in a serviceable condition. All the aircraft documentation (Certificate of Airworthiness, Certificate of Registration, Weight and Balance Certificate etc.) carried on board was valid. The maintenance documentation (work packs and logbooks) was reviewed and found to be satisfactory.

- 2.5 The pilot flew the helicopter from Grand Central Aerodrome to Kitty Hawk after its MPI. The next time he flew the aircraft again was on the day of the accident. In all, the helicopter accumulated just 0,6 hours' flying time between the MPI and the accident. The pilot did not report any defects or malfunctions with the helicopter during this time, and the sudden spluttering and loss of power during the accident flight was the first problem experienced. The pilot assessed the situation, realised the problem could not be resolved and decided to execute an autorotation emergency landing. Just before touchdown, the helicopter was flared to cushion the landing. During the landing sequence, the helicopter struck the ground and rolled over, in the process of which the main rotor blades severed the tail boom. The aircraft was substantially damaged.
- 2.6 The engine was examined to determine the cause of the power failure and a ground run was carried out to verify the performance. The engine ran smoothly as required within acceptable limitations and no anomaly was identified. It was not possible to determine the cause of the engine power loss.

3. CONCLUSION

3.1 Findings

- 3.1.1 The pilot had a valid private pilot's licence (PPL - helicopter) and the type rating was endorsed on it.
- 3.1.2 The pilot also had a valid Class 2 aviation medical certificate with no waivers.
- 3.1.3 The pilot operated the helicopter privately in the General Aviation (GA) sector in accordance with Part 91.
- 3.1.4 The helicopter was operating from Kitty Hawk Estate Airfield.
- 3.1.5 All the aircraft documentation carried on board the helicopter was valid.
- 3.1.6 The pilot reported that the engine started to splutter and this was followed by a loss of power.
- 3.1.7 The engine was examined; thereafter a ground-run was performed and the engine found to be operating satisfactorily.
- 3.1.8 It was not possible to determine the cause of the loss of engine power as the engine performed satisfactorily when ground-run.
- 3.1.9 The pilot executed an autorotation landing on an open stretch of veld on the southern side of Kitty Hawk Estate Airfield.
- 3.1.10 During the autorotation landing sequence, the helicopter struck the ground and rolled over onto its right side.

3.1.11 During the ground impact sequence, the main rotor blades struck the tail boom, severing it. The helicopter sustained substantial impact damage.

3.1.12 Neither pilot nor passenger suffered any injury.

3.1.13 The quantity of fuel carried on board was determined to be sufficient for the intended flight. The remaining fuel, all in the right-hand side tank, was estimated to be approximately 20 lbs.

3.1.14 The helicopter was maintained by an approved aircraft maintenance organisation (AMO) authorised to carry out maintenance on the aircraft type.

3.2 Probable Cause/s

3.2.1 Unsuccessful autorotation landing after experiencing a loss of engine power during flight.

4. SAFETY RECOMMENDATIONS

4.1. None.

5. APPENDICES

5.1.1 None.

Compiled by:

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For: Director of Civil Aviation

Date:

Investigator-in-charge:

Date:

Co-Investigator:

Date: