

ACCIDENT

Aircraft Type and Registration:	SA341G Gazelle 1, G-WDEV	
No & Type of Engines:	1 Turbomeca Astazou IIIA turboshaft engine	
Year of Manufacture:	1973	
Date & Time (UTC):	10 January 2012 at 0939 hrs	
Location:	Salisbury, Wiltshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 2
Injuries:	Crew - 1 (Minor)	Passengers - 2 (Minor)
Nature of Damage:	Extensive	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	51 years	
Commander's Flying Experience:	5,400 hours (of which 47 were on type) Last 90 days - 40 hours Last 28 days - 10 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot, photographs of the accident site, eyewitness information and recorded GPS position data	

Synopsis

The pilot reported a power loss and uncontrolled descent into trees while manoeuvring at slow speed and low height over a remote landing site.

History of the flight

The helicopter was prepared for a flight from a private site near Bath to a landing site adjacent to an industrial estate on the outskirts of Salisbury. A normal daily inspection was completed with no faults noted.

The two passengers arrived in good time and were given a safety briefing by the pilot. Pre-flight checks were normal and the helicopter took off at 0910 hrs. Fuel load on departure was 220 kg, and takeoff weight

had been calculated as 1706 kg, nearly 100 kg below the maximum allowed.

The short flight to Salisbury was uneventful. The weather was suitable with a light westerly wind. The intended landing site was a clearing in a wooded area between an industrial site and a river. The pilot had not previously landed there but had previously seen the landing area from the air.

The pilot reported approaching the site from the west, before turning to conduct an overflight in a westerly direction at about 500 ft agl. He then flew an orbit to approach the site for landing. He reported flying a steep

approach into the site and establishing in a stable hover in ground effect. As he lowered the collective lever and the helicopter started to settle, it reached what the pilot considered to be an unacceptably tail-low attitude. He therefore lifted into the hover again with the intention of re-positioning.

The pilot manoeuvred the helicopter upwards and rearwards, whilst keeping the landing area in sight. After initially lifting to about 30 ft with the tail clear of obstruction, he was unable to determine a more favourable landing area so continued the climb. At about 60 to 70 ft the pilot noticed the tone of the main rotor RPM (RRPM) change, suggesting a reduction in RPM. He did not check the RRPM indication, but instinctively reduced collective input, believing the decline in RRPM would be transient. However, RRPM did not appear to recover and the helicopter started to sink.

At this point, the helicopter was to the side of the intended landing site and over tree tops. As it started to descend, the pilot pulled the collective lever up positively. He then heard pronounced popping and cracking noises and sensed a further reduction in RRPM (his perception was based on sound alone). He did not recall any appreciable yawing motion.

With RRPM dropping significantly and the flight controls appearing to lose effectiveness, the pilot steered the descending helicopter towards an area where the tree tops were lowest, whilst attempting to keep its nose from dropping. The helicopter came down through the trees; the pilot thought it struck the ground in an upright attitude but then rolled over onto its left side.

The engine was still running immediately after the accident. The pilot switched off the engine and electrical master switches and the fuel booster pump, but was unable to identify the engine throttle or manual

fuel cut-off lever in the damaged roof panel. At this time the front seat passenger appeared unconscious but the rear seat passenger responded to the pilot's call. The pilot exited the aircraft through the broken front windscreen area and saw that flames were coming from behind the engine cowlings. With some difficulty, he was able to locate the throttle control and retard it to idle. This action reduced engine speed and noise but the flames persisted.

The pilot then retrieved the BCF fire extinguisher from the cabin and discharged it fully into the engine air intake, upon which the engine stopped and the flames died down. He helped the rear seat passenger from the helicopter and then the front seat passenger, who had regained consciousness. Onlookers from the industrial site soon arrived, including one with a large CO₂ extinguisher which was discharged into the engine area.

The emergency services had been alerted by eyewitnesses. The pilot and one passenger were subsequently taken to Southampton Hospital by air ambulance whilst the remaining passenger travelled the short distance to Salisbury Hospital by road ambulance.

Recorded information

Data from the aircraft's GPS navigation system was downloaded for analysis. The unit was set to record data every thirty seconds including position, GPS altitude, date and time, track and groundspeed¹. This data showed that the helicopter flew past the landing site to the south at low level before turning left to approach the area from an easterly direction.

Footnote

¹ On this model of gps the recorded values of groundspeed include not only speed over the ground but also any vertical speed component.

As it turned left it was about 400 m east of the landing site, at a height (based on GPS altitude) of about 350 ft agl. The instantaneous track at this point was 353°(M) at 35 kt groundspeed, suggesting that the helicopter was turning left towards the landing site as reported by the pilot. The next recorded position was about 100 m south-east of the landing site, at a height of about 280 ft. The aircraft was tracking 245°(M) at 16 kt groundspeed.

The distance between these two points is 361 m, consistent with an approximately direct track between the two points at an average groundspeed of about 24 kt, midway between the two recorded values. One further data point was recorded. This occurred 38 seconds after the previous point and, as the normal recording interval was 30 seconds, indicates that a loss of satellite signal had occurred. The position of this point was very close to the crash site, with an instantaneous track of 141°(M) and at a height of about 220 ft. The reason for the loss of satellite signal between the last two recorded points could not be determined.

Witness information

A number of eyewitnesses at the industrial site had seen the helicopter and realised it was in difficulty. One reported that her attention was drawn to it by the fact that it was unusually low (although she was unaware that it intended landing in the area). She saw it initially moving in an easterly direction just above the trees and had the impression it was already in trouble. The tail appeared to clip the trees and the helicopter started to rotate before the nose dropped and it descended from view.

Accident site information

The intended landing site was a small clearing in a strip of wood and scrubland lying between the industrial site and a river, approximately 450 m by 100 m. The orientation of the wooded strip was approximately east-west. The helicopter came to rest among trees, about 45 m to the south-east of what is believed to have been the intended landing site.

Photographs of the wreckage and general area, taken before the wreckage was recovered, showed that the helicopter had descended through the trees with little forward motion. A noted anomaly was a tear in the aircraft skin at the forward base of the upper vertical fin, forward of the enclosed tail rotor. Trapped in the folded skin material were leaves from a fir tree, which was not a type found in the immediate vicinity of the crash site. Further photographs of what is believed to have been the intended landing area showed a substantial fir tree of a matching type, with what appeared to be damage to branches at less than half its height. With no height reference, an accurate height of the damage above ground could not be determined, but was estimated to be in the order of 15 to 20 ft.

The tear pattern of the skin material on the fin suggested a significant sideways motion (most likely a helicopter nose left / tail right yawing motion) at the time of contact. With the limited evidence available, it was not possible to be more specific about how the damage occurred or what part it may have played in the accident sequence.