

N578AE mishap, Houlton Air Branch, Jan 17, 2014

Omaha 578AE was returning to KHUL after flying a search and rescue mission for the Maine Warden Service. AIA ---- was the PIC (in the command seat) and AIA ----- was the second AS350 designated AIA (in the copilot seat). The PIC, AIA ----, planned to reset night & NVG currency at the completion of the mission while AIA ----- planned to practice for his APE coming up the week of Jan 20, 2014.

After AIA ----- completed a third takeoff and landing iteration, as the aircraft climbed through approximately 15 feet on takeoff; there was a loud explosion. Immediately following the explosion; the audible NR over-speed warning sounded and a vertical vibration developed. The engine and rotor noise rapidly increased to a level which almost covered the high NR warning. At this instant, the aircraft had not yet begun the yaw oscillations. Also at this point in time, I was trying to identify the source of the 'explosion' sound we heard. Since the aircraft was not yawing, I concluded the T/R was intact and producing anti-torque thrust. I could not quite hear if the NR warning was intermittent or continuous due to the noise level. I briefly thought the NR warning was a low (continuous) horn and told AIA ----- (PF) we could have a low rotor. I believe AIA ----- slightly lowered the collective in response to my statement. The aircraft noise increased and a yawing oscillation began. I immediately took the aircraft controls. As I did, I observed two **amber** caution lights and what I believed to be two **red** warning lights on the Caution & Warning Panel (CPW). The severe vertical vibration and almost uncontrollable yaw oscillations continued, as did the high NR warning.

Solid aircraft control was impossible and I focused all of my attention and effort on trying to keep the aircraft 'skids' level; keeping it from impacting the ground and preventing it from climbing out of ground effect. I could not ascertain the airspeed, nor could I distinguish the information on the VEMD. There were three instances where I estimated the aircraft experienced a 30°-40° bank (via NVGs).

Throughout the event evolution, I could not adjust the collective without inducing extreme attitude excursions. I also could not keep the helicopter's attitude in a position where I could roll off the throttle. The aircraft's attitude excursions began to 'calm down' after about 30 seconds. I was able to control the helicopter and land. At this point the aircraft was over the south end of runway 5-23, and approaching the snow bank in the over run. I allowed the helicopter to hover over and past the snow bank and continue to touchdown about 250 yards past the overrun. I did not lower the collective at all during this phase of the event. Upon ground contact, I lowered the collective all the way down and rolled the throttle to 'idle'. Neither the engine, nor the rotor accelerated, or spooled up when the collective was lowered. There was no engine sound at all by this time. I do not recall if the high NR warning horn was sounding when I set the helicopter down.

As the helicopter approached the ground, I could see the orange fire light reflecting off the snow around the aircraft. I immediately looked at the CWP; the red **FIRE** light was not illuminated. I confirmed the two **red** lights I saw after the explosion were actually the amber **ENG CHIP** light and the red **GOV** light. I did not notice, at the time, what the two **amber** lights were. Also during the mishap evolution the copilot's door was forced open by the violent oscillations. The aircraft was not damaged during the emergency landing and the engine fire was very developed when the aircraft was landed. Once a fire was confirmed, I directed AIA ----- to pull the emergency fuel cutoff; he did and completed an emergency shutdown. I applied the rotor brake and we egressed from the aircraft. AIA ----- attempted to fight the fire with the aircraft fire extinguisher, but was unsuccessful.

After reviewing the aircraft systems training material, I was able to estimate which **amber** lights were illuminated after the explosion: Amber **FUEL P** light & amber **DOOR** light.

Co-pilots statement on N578AE mishap SIP

On January 17, 2014 N578AE was returning to KHUL after performing a search and rescue mission for the Maine Wardens Service. As the co-pilot (CP) I was flying the return leg and the pilot in command (PIC) and I intended to perform take-off and landings to reset our night and NVG currency requirements. I entered a left downwind for runway 23 with reported light winds from 210. I performed a landing and takeoff at approximately the approach end numbers, mid-field, and the middle of the departure end aim point markings. After picking up into a hover from the third landing I began to execute a take-off with forward cyclic and a slight amount of increased collective. As I was beginning to apply the forward cyclic I heard and felt a loud explosion toward the aft of the aircraft followed by a severe vertical vibration and the engine became extremely loud. The aircraft immediately began to experience cyclic controllability problems with some yaw instability as well. The PIC called out the rotor RPM warning horn but it was difficult to tell which warning (constant or intermittent) it was for the engine noise. Aircraft control continued to rapidly decay for the remaining five to ten seconds I was flying at which point the PIC took control of the aircraft.

Once I released aircraft control to the PIC I made two mayday calls to Houlton sector dispatch (620). Almost immediately after making the mayday call the aircraft began severe pitch and roll oscillations. Sometime during these oscillations the left side door came open but I was able to get a hand on the door and get it closed again. Around this time I was able to take a very quick look at the Caution and Warning Panel (CWP) and noticed the red GOV light was on. After ten to twenty seconds of the severe oscillations the PIC was able to regain some control and the aircraft seemed to settle down along with a decrease in engine and rotor noise. Once the aircraft was somewhat under control the PIC announced he was going to proceed past the end of the runway to avoid the snowbanks piled up there.

Once the aircraft settled to the ground the PIC directed me to execute an emergency shutdown as he lowered the collective. I pulled the red fuel cut-off handle next to the rotor brake and switched off the battery. The PIC then stated he thought we were on fire where I looked at the FIRE light on the CWP which appeared to be unlit. There was an orange glow on the snow surrounding the aircraft which led me to believe we were on fire as well. Upon exiting the aircraft I noticed flames coming from the engine compartment. I walked around to the right side of the aircraft, removed the fire extinguisher, and discharged it into the inspection port on the right side of the engine cowling to minimal effect. I then removed the hand held radio from the XTVA vehicle radio adapter underneath the right rear passenger seat and notified dispatch that the PIC and I were both ok. I announced to responding units where we were located on the field and we needed firefighting units to respond.

Over approximately the next ten minutes several CBP Field Operations and CBP Border Patrol units arrived to assist and the Houlton Fire Department arrived roughly ten minutes after shutting down the aircraft. The fire department seemed to have trouble getting their pump to work so the initial firefighting efforts involved dry chemical fire extinguishers. Eventually the firefighters were able to put water on the engine compartment. Around this time one of the firefighters asked me if the aircraft power was secured. I looked at the center panel in the aircraft to verify that power and fuel were off and moved the emergency electrical cut-off switch to be sure all power was off.