

Crew member 1- Instructor

We departed the ramp at approximately 2:15 pm CDT May 22, 2017. We flew southwest towards our practice area, approximately 6 miles from the airport. We were performing a practice private check ride (Practical Test) in preparation for the students upcoming check ride. We performed settling with power, a 180 autorotation and an off airport confined area landing with a max performance take off. We then returned to the Flying Cloud (KFCM) airport for pattern maneuvers with normal, steep and shallow approaches. We also performed a straight in autorotation and a run on landing to the runway. From the runway we requested air-taxi to the, designated on airport, grass helicopter practice area, next to the tower. As we approached the practice area we practiced a couple quick stops, and then proceeded to practice slope landings and hover auto-rotations. The students first hover auto-rotation went very well, so we attempted another one. It was during the second hover auto-rotation that the incident occurred approximately 3:20 pm CDT.

The setup for the hover autorotation was to point into the wind, enter a stable 1 foot hover and roll off the throttle to simulate an engine failure in hover, pull up on the collective to slow the descent and cushion the landing. The student counted down 3,2,1 and rolled off the throttle, the helicopter descended to the ground, appeared to bounce, moved slightly to the right and began a quick roll to the right. As correcting control inputs were being applied the main rotor blades came in contact with the ground and the helicopter rolled over completely onto its right side. This all took place in about 3 seconds. The student had performed all of the other maneuvers within PTS (Practical Test Standards) tolerances before the incident.

Crew member 2 – Student

This was dual flight after which I planned to do more solo flying practice in preparation for my Helicopter private pilot practical test. I felt very comfortable and competent in the helicopter and am quite familiar with the Helo emergency procedures.

Last maneuvers practiced were slope landings and power loss in hover in the practicing area at the KFCM Class-D airport. Stiff W-SW wind was blowing and on several occasions I noticed and informed instructor Lichty that I was fighting strong LTE. Helo was controllable at all times, but it was making precision hover maneuvers very difficult. Practicing left-side slope landings was very challenging because of the LTE and strong mechanical turbulence from nearby hangars. As we moved away and in the more clear

areas the right-slope landings and takeoffs went very well and smooth. I was able to hold Helo level and motionless while the right skid was in ground contact.

As the last maneuvers the CFI Lichty suggested going back to the NE ramp for hover "auto-rotations". I made remark/comment that with previous instructor we did those maneuvers also in the grass area. The CFI Lichty said ok then directed me to move north of the current location to practice few hover autos. I was very focused in flying the helicopter and was not paying too much attention to area. The grass was much taller and thicker and at that point I was not even thinking that in the previous 7-8 days we had constant rain and that soil might have been soaked and soft and the grass was very thick and tall.

I was instructed to maintain 1-foot hover height and westerly heading and demonstrate few power losses in hover. In all honesty I was never very comfortable with this maneuver. I also expressed my concerns to CFI Lichty as I did to my former instructor. I did few hover-autos, but I never liked them as they seemed to be a "hit or miss" maneuver. There is simply no time to notice changes and the control movement rates and displacements are guessed and automatic. Very easy to overcontrol. We rehearsed the maneuver while I was hovering and I knew (and also studied) that right anti-torque pedal is required due to the loss of MR torque. I also knew that some right cyclic is needed to compensate for the loss of TR drift (helo would drift to the left). But how much and at what rate? I rolled off the throttle and immediately started pulling collective with the right AT pedal and bit of right cyclic and we did pretty decent level-skids zero-yaw touchdown with almost no, or little, sidedrift. CFI Lichty praised the maneuver and suggested one more (and last dual maneuver) with the note that we need to have helicopter settling down before moving collective up. But we were only 1-foot skid high and not 3 feet!

Listening to suggestion I decided to hesitate a bit before starting to pull collective up. I was very focused on the maneuver and all my hands and feet were busy on controls. While hovering I had left skid down significantly and a decent amount of cyclic pull to the left to keep the Helo steady over the ground point. I was also simultaneously battling LTE as I was getting gusty cross-winds. So again I rolled off throttle and hesitated this time before pulling collective. However, as I just started pulling collective up Helicopter already touched down. It was not hard touchdown! But we recoiled a bit plus my collective was now going all the way up. We became airborne again. I kept the heading almost constant (no significant yaw on touchdown) and I probably relaxed and added

some right cyclic. Cannot recall. As the helicopter became airborne almost at the same time the left skid lifted up higher and helicopter started rolling rapidly to the right. It rolled probably at the rate of 20-30 degrees per second. There was nothing I could do. I did not have time to pull the mixture, shut the fuel, or anything else as all my hands were on the cyclic and collective. From the moment I rolled off throttle to the point that blades started striking the ground probably no more than 3-4 seconds have elapsed. I do not think that lowering collective would have done anything as the rotational inertia was too powerful. In retrospect I realized that I started adding full collective (up from the one needed in hover) at the moment of initial touchdown. That initial hesitation was not needed and just made things much worse. If I didn't touch collective everything would have been OK. If we were on asphalt nothing like this would have happened. So we were set up for dynamic rollover. Probably combination of strong left crosswind, LTE, perhaps moving cyclic too much to the right, right sideslip with right skid perhaps getting caught in the soft soil and/or thick grass/roots after the first touchdown provided all ingredients for dynamic rollover. It is possible that on the initial touchdown the right skid buried itself in the sticky ground more than the left one. I did not see and cannot confirm if CFI Lichty was having his hands on the controls and whether he was trying to act/react. It all happened so fast. I recall yelling "NO! NO! NO! This is not possible!". Luckily, throttle was in override, engine idling, and it stopped after just 1-2 rotations destroying blades. As I exited the helo first I asked instructor Lichty to pull the mixture and shut the fuel. He already turned magnetos off.