

On July 8th of 2023 my student and I had briefed to go up and train for a stage 3 check flight. We took off from KEUL at approximately 1320. AWOS at the time of takeoff had reported around 4500' Density Altitude and the altimeter setting was 29.88 inH. This flight would involve practicing various maneuvers in the foothills 6-7 miles south of S78. We started with flying 2 legs of a mock flight plan that the student made and proceeded to practice some Vortex Ring State recovery maneuvers at altitude. We both conducted a "Legacy recovery method". We then proceeded north bound to do an off airport landing. The first landing was well executed. I demoed the same off airport landing for training purposes. At this point we knew the wind direction was coming out of the 280 direction at around 7 knots. We proceeded North bound to look for another site to land cruising around 500' AGL. At cruise speed I announced "engine out" 3 times and the student entered an autorotation for a forced landing maneuver. Shortly after the entry of the autorotation I told him to recover and the student performed the power recovery. We proceeded to fly to another off airport site just west of the first off airport site. The student performed a well executed off airport landing and we continued working our way north to our next off airport landing site. En route I had seen a great opportunity to demonstrate an engine out that would require a turn in the autorotation. I checked that the carburetor heat was fully applied and did an instrument check stating "Tachs in the green' 3 in the green' carb heat is pulled and out of the yellow, fuel is good" after which I stated "I have Controls" I then took the controls and announced "Engine out" 3 times and entered an autorotation 3100' indicated. I immediately began the turn while keeping a scan between my spot, Rotor RPM's and Airspeed. Rotor RPM's were in the green (never got the Low Rotor RPM Warning System) however airspeed was around 55 knots. While this maneuver was something I was very familiar with there were many variables working against me. A low entry altitude, a high density altitude, a low pressure altitude, a low airspeed, all while including a turn in the autorotation created a situation that was not recoverable. While I had full intentions on making a power recovery at 200' AGL, my descent rate was much larger than anticipated. At this point I began to roll on throttle. While the Engine RPMs and Rotor RPMs matched, no matter what I did, every time I pulled collective to recover, the Rotor RPMs would begin to droop. At this point I knew that Rotor RPMs and keeping airspeed were the 2 most important things to complete a safe autorotation. There was a time where my focus had to shift from trying to fly away and recover, to plan for a full down autorotation. When I realized the aircraft would not recover I began a cyclic flare. Because of the density altitude, low pressure and low airspeed, the aircraft did not have enough performance to react accordingly. At this point ground contact was made. Because I had managed to keep my Rotor RPMs in the green I was able to utilize the energy to soften the landing, however, I had a good amount of forward ground run. The soft dirt caused the skids to catch and overturn the aircraft. While this accident comes down to poor decision making on my part, I do believe that while not perfect, the autorotation was managed well enough to let us survive and walk away. The lesson I learned from this experience is incredibly beneficial and one I believe many pilots can learn from. As a Certified Flight Instructor, the line between what is safe and what is not safe can become jaded and lead to complacency. My hope is that this can be used as a tool for pilots to learn from and never repeat. I am a safer pilot because of this experience.