CALLBACK ASRS

From NASA's Aviation Safety Reporting System

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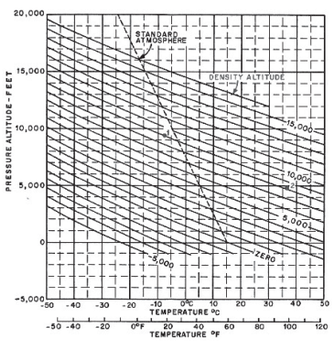
Density Altitude



As summer approaches, temperatures increase and density altitude becomes an important consideration for pilots. High density altitude can affect aircraft in several ways. Wing or rotor lift is decreased. Engine power is reduced. Propeller, rotor, and jet engine thrust are decreased. Degraded aircraft performance results in increased takeoff distance, reduced rate of climb, increased true airspeed on approach and landing, and increased landing roll distance.

Precise calculation of performance data and strict adherence to Pilot's Operating Handbook (POH) procedures are critical for high density altitude operations.

Squeeze Play

This instructor and student used the POH to calculate the rotation speed but neglected to follow the procedure for leaning the fuel mixture. They put their C172 into a spot where there was not enough speed to takeoff and not enough runway left to abort.

■ *...With full tanks and increasing density altitude, the engine was unable to produce the needed power to achieve the rotation speed of 48 knots. After passing the intersection of Runway 13/31 we were at 42 knots. At this point we decided to rotate because there was not enough runway left to abort the takeoff.... Unfortunately, after rotation, the stall warning horn sounded at about 10 feet. We did not have enough distance to climb and clear the obstacles at the departure end of the runway. We decided to cut the power and land.... At this point we believed that there was some runway and hard grass surface to stop the plane. Unfortunately, the brakes did not catch the wet grass and we slid into the plowed field 200 feet south of the runway....*

In my opinion, if we had tried to keep it in the air the outcome could have been much worse. However, there were some errors in our judgement. The density altitude was significantly higher than it had been in the last several months. Keeping the high density altitude in mind, apparently one thing that we could have done to produce more power [would have been to] lean the mixture for takeoff...

In general, when the density altitude exceeds 5,000 feet, normally aspirated engines should be leaned for optimum performance. Follow the POH procedures for specific aircraft and engines.

High, Heavy, Fast, and Fortunate

If an aircraft is operating at the edge of its performance at a high density altitude there is no room for error— even in the cool of the night.

■ *I was landing at night.... I came in too fast. About 3/4 of the way down the 4,700 foot runway, I decided to go around. Density altitude was about 8,000 feet. The gross weight was 2,260 lbs. and max weight is 2,300 lbs. for the C172. When I retracted the flaps for the go-around (the flap switch is not notched), the flaps went to 0 degrees and I lost lift and altitude. I saw that I was not going to clear the power lines about 1,500 feet away, so I landed the plane on a grass field past the end of the runway.... It was my second landing at this field and only my third landing at high altitude....*

Heavyweight Joins Wheat Watchers

"Oops! Let's try that again," is not something you want to hear from your surgeon. And, as a passenger of a light aircraft departing a high altitude airport, it is not something you want to hear from the pilot after he takes off and settles into a wheat field.

■ *I took off, climbed to 5,800 feet, retracted the flaps, and descended into a wheat field. I pushed the plane onto a road. The passengers departed the airplane and went back to [the airport]. I took off from the road, proceeded back to the airport, and picked up the passengers. [I] took off again and proceeded home.... The density altitude was approximately 8,700 feet. The aircraft was within 200 lbs. of max gross weight. A maintenance checkout found no problems with the engine.*

Field Maneuvers

Even a powerful World War II training aircraft can have a hard time when a soft runway is combined with a high density altitude.

■ *Takeoff was at an altitude of [over 4,000] feet with temperatures in the 90's. Density altitude was estimated at 8,000 feet. [I] selected the grass runway which is approximately 4,700 feet long. The aircraft did not maintain flying attitude after rotation and proceeded off the runway into a plowed field. I should have determined the effect of using a grass runway on the takeoff performance....*

Editor's note:

Scott Gardiner of the FAA's Seattle Flight Standards District Office has published an excellent review based upon the density altitude seminars given by National Transportation Safety Board (NTSB) Accident Investigator Kurt Anderson. The article was printed in the May/June FAA Aviation News which is available at: http://www.faa.gov/AVR/afs/news/

ASRS Recently Issued Alerts On…
B737-200 flap carriage spindle failure
Eurocopter 120B main gearbox oil loss
C750 elevator control cable interference
Faded runway hold short lines at a foreign airport
Inadequate taxiway markings at a southern U.S. airport

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April 2004 Report Intake	
Air Carrier / Air Taxi Pilots	2194
General Aviation Pilots	757
Controllers	37
Cabin/Mechanics/Military/Other	94
TOTAL	**3082**

Controller's Corner

Enhance Your Image

Flight following, although not mandatory, is certainly recommended for aircraft operating VFR in or near congested airspace. A request for flight following alerts ATC to the presence of an aircraft which may not be apparent on radar and can enable traffic advisories (controller workload permitting) to be given to the pilot. If a transponder is required for the airspace in question, then it is incumbent upon the pilot to ensure that the unit is operational and activated. The airborne TCAS (Traffic Alert and Collision Avoidance System) also relies upon transponder signals to identify traffic conflicts. Use of flight following and/or activation of a transponder by the Cessna in this incident could have prevented a Near Mid-Air Collision (NMAC).

■ *[Air Carrier] X departed on a Standard Instrument Departure. About six miles from takeoff, I vectored him to 090 degrees to go around [Air Carrier] Y at 5,500 feet. I issued [Air Carrier] X traffic at two o'clock, five miles, 5,500 feet northbound. The pilot looked for the traffic, but saw a Cessna instead and had to dive to avoid a collision. No targets were observed between the two air carriers on radar at the time I issued the traffic. Upon replay of the radar data, a diamond symbol, used for primary targets on the ARTS (Automated Radar Terminal System) display, was observed to be first displayed five miles south of the NMAC point. No slash representing a primary target skin paint return or a transponder return was displayed. There was no history of this target being displayed prior to this point.... The most important factor preventing me from viewing the Cessna target was the fact that the diamond symbol was concurrent with the data blocks and targets of two other aircraft circling in the area....*

At no time did the target display a transponder code.

A better radar return on the Cessna certainly would have helped, but the heavy concentration of traffic and several other aircraft in the immediate area cluttered the radar presentation so much that just seeing all the data blocks, let alone stray traffic, became difficult. Even more important, as a controller and pilot, I feel that flying the route and altitude the Cessna took over a major air traffic area was not consistent with good planning and procedures unless the pilot had used Flight Following from ATC.

I know that many pilots think ATC can see them, but if their transponder is not working properly, we won't see them and they won't know it. Perhaps this could be addressed at the FAA's pilot briefings or in biennial flight reviews.

Cabin Report

Say Good-bye to Trouble

In the event that inebriated passengers manage to get through the boarding process, sharp cabin crews can prevent in-flight disruptions by removing them before takeoff.

■ *I was working as Flight Attendant #1 when Flight Attendant #4 informed me that there were 11 first class passengers instead of the 10 listed on my final paperwork. I called out names on my list and matched them with all passengers except for one in seat 1X. She told me her name, which was also the woman's name in seat 1Y. So, I asked to see their boarding passes and 1Y handed me the one for her connecting flight... She said she didn't have the one for this flight. I asked for her identification and verified that she was who she claimed to be. I then asked the person in 1X for her identification and she said she didn't have it. I told her she did or she wouldn't be on the plane. I called the Captain and he said she had better show some identification now or we were going to return to the gate. She got out of her seat and stood directly in front of me and said quietly, "Oh, I'll show you something." She then very slowly lifted the flap of her purse and pulled out her identification. She was not who she claimed to be. I asked her if she had been drinking and she said "Well yeah." I had her sit back down because she was swaying and talking very slowly. I called the Captain again to inform him of the passenger being drunk and lying about who she was. He said the agents were meeting the plane back at the gate.... As the inebriated passenger exited the airplane she turned to me and said, "What a safe airline you run." I said, "We try to keep it as safe as possible. Good-bye."*

From the Maintenance Desk

Cap It!

Judging from the number of reports submitted to ASRS, the problem of missing or improperly secured engine oil caps is still a concern. Let's get the word out and put a cap on this problem.

■ *After removing and replacing the oil filters I am required to have another mechanic run both engines to perform a leak check on the filter assemblies. After performing the leak check, the left engine required servicing. At this time I noticed a ramp employee waiting for access to service the lavatories. I serviced the oil to full and then moved the lift truck, closed the cowling, and moved to the next engine. After completing the work on the right engine and noticing that the ramp employee was finished servicing the lavatories, I returned to latch the cowling closed. I left the oil cap removed.*

■ *Excessive oil was discovered on the engine cowling of the #2 engine. Upon further inspection it was found that the oil tank cap was unsecured. The engine was serviced with six quarts of oil and continued in service. I had serviced the engine oil the previous night and may have left the oil tank cap for the #2 engine unsecured, causing the loss of oil. I have a good system for ensuring that the oil tank caps are secure, but it is possible that I may have erred on this occasion.... It was night, with good weather conditions and no distractions....*