BLUE MTN CHAPTER 604

APRIL 2021

THE RITE FLYER

MARTIN AIRFIELD

Coming Up . . .

Meeting :
Monday , April 12th, 7:00 p.m. Online
Program: AOPA Honor Flight
Board of Directors
April 10, 7:00 pm
Next Meeting:
May 10th, Online at this time

Chapter Website:
chapters.eaa.org/eaa604

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Density Altitude faasafety.org

Introduction

Although density altitude is not a common subject for "hangar flying" discussions, pilots need to understand this topic. Density altitude has a significant (and inescapable) influence on aircraft and engine performance, so every pilot needs to thoroughly understand its effects. Hot, high, and humid weather conditions can cause a routine takeoff or landing to become an accident in less time than it takes to tell about it.

Density Altitude Defined

Types of Altitude

Pilots sometimes confuse the term "density altitude" with other definitions of altitude. To review, here are some types of altitude:
• **Indicated Altitude** is the altitude shown on the altimeter.
• **True Altitude** is height above mean sea level (MSL).
• **Absolute Altitude** is height above ground level (AGL).
• **Pressure Altitude** is the indicated altitude when an altimeter is set to 29.92 in Hg (1013 hPa in other parts of the world). It is primarily used in aircraft performance calculations and in high-altitude flight. • **Density Altitude** is formally defined as "pressure altitude corrected for nonstandard temperature variations."

Why Does Density Altitude Matter?

High Density Altitude = Decreased Performance

The formal definition of density altitude is certainly correct, but the important thing to understand is that density altitude is an indicator of aircraft performance. The term comes from the fact that the density of the air decreases with altitude. A "high" density altitude means that air density is reduced, which has an adverse impact on aircraft performance. The published performance criteria in the Pilot's Operating Handbook (POH) are generally based on standard atmospheric conditions at sea level (that is, 59 ₀F or 15 ₀C. and 29.92 inches of mercury). Your aircraft will not perform according to "book numbers" unless the conditions are the same as those used to develop the published performance criteria. For example, if an airport whose elevation is 500 MSL has a reported density altitude of 5,000 feet, aircraft operating to and from that airport will perform as if the airport elevation were 5,000 feet.

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Calendar Items to share

Week Days Coffee Club, Martin Field Pilot's Lounge, **Cancelled until further notice**

Fly-outs are sparse due to social distancing and crowd size limitations.

Density Altitude *continued*

High, Hot, and Humid

High density altitude corresponds to reduced air density and thus to reduced aircraft performance. There are three important factors that contribute to high density altitude:

1. Altitude. The higher the altitude, the less dense the air. At airports in higher elevations, such as those in the western United States, high temperatures sometimes have such an effect on density altitude that safe operations are impossible. In such conditions, operations between midmorning and midafternoon can become extremely hazardous. Even at lower elevations, aircraft performance can become marginal and it may be necessary to reduce aircraft gross weight for safe operations.
Note: This document was adapted from the original Pamphlet P-8740-2 on density altitude.

2. Temperature. The warmer the air, the less dense it is. When the temperature rises above the standard temperature for a particular place, the density of the air in that location is reduced, and the density altitude increases. Therefore, it is advisable, when performance is in question, to schedule operations during the cool hours of the day (early morning or late afternoon) when forecast temperatures are not expected to rise above normal. Early morning and late evening are sometimes better for both departure and arrival.

3. Humidity. Humidity is not generally considered a major factor in density altitude computations because the effect of humidity is related to engine power rather than aerodynamic efficiency. At high ambient temperatures, the atmosphere can retain a high water vapor content. For example, at 96 °F, the water vapor content of the air can be eight (8) times as great as it is at 42 °F. High density altitude and high humidity do not always go hand in hand. If high humidity does exist, however, it is wise to add 10 percent to your computed takeoff distance and anticipate a reduced climb rate.

Check the Charts Carefully

Whether due to high altitude, high temperature, or both, reduced air density (reported in terms of density altitude) adversely affects aerodynamic performance and decreases the engine's horsepower output. Takeoff distance, power available (in normally aspirated engines), and climb rate are all adversely affected. Landing distance is affected as well; although the indicated airspeed (IAS) remains the same, the true airspeed (TAS) increases. From the pilot's point of view, therefore, an increase in density altitude results in the following:

- Increased takeoff distance.
- Reduced rate of climb.
- Increased TAS (but same IAS) on approach and landing.
- Increased landing roll distance.

Because high density altitude has particular implications for takeoff/climb performance and landing distance, pilots must be sure to determine the reported density altitude and check the appropriate aircraft performance charts carefully during preflight preparation. A pilot's first reference for aircraft per-

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Best Glide Speed and Distance

The General Aviation Joint Steering Committee (GAJSC) has determined that a significant number of general aviation fatalities could be avoided if pilots were better informed and trained in determining and flying their aircraft at the best glide speed while maneuvering to complete a forced landing.

What is Best Glide Speed?

Is it the speed that will get you the greatest distance? Or is it the speed that gets you the longest time in the air? Or are these two the same — the longer you fly, the further you go? Well, as so often is the case, best glide speed depends on what you're trying to do.

Going the Distance

If it's distance you want, than you'll need to use the speed and configuration that will get you the most distance forward for each increment of altitude lost. This is often referred to as best glide speed and, on most airplanes, it will be roughly halfway between Vx (best angle of climb speed) and Vy (best rate of climb speed).

Keep in mind that this speed will increase with weight so most manufacturers will establish the best glide speed at gross weight for the aircraft. That means your best glide speed will be a little lower for lower aircraft weights.

Need More Time?

If you're more interested in staying in the air as long as possible to either fix the problem or to communicate your intentions and prepare for a forced landing, then minimum sink speed is what you'll need. This speed is rarely found in Pilot Operating Handbooks, but it will be a little slower than maximum glide range speed.

What About My Airplane?

If you're wondering about the airplane you fly, you can do some experiments on a dual flight with your flight instructor. Start at Vy or the manufacturer's recommended best glide speed with power off — you did remember the carb heat, didn't you? — and note speed vs. sink rate as you adjust pitch to reduce airspeed. For the most useful results, you should do this as close to typical mission weight as possible. To

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EAA 604 Minutes, March 8, 2021

The meeting was called to order by President Bill Herrington at 7:03 p.m. Don Gibbard took attendance. There were 10 members present online and two guests. Those present approved the minutes of the last meeting.

Board Meeting: The Board created a 2021 Budget and Balance Sheet for the Chapter as part of the Sherwood Trust grant request we were submitting. The budget is a guideline and not a firm spending plan. It will used to analyze our Chapter income and expenses for future budgets.

We discussed the upcoming Young Eagle Rally. It will be June 5th, Saturday, at Martin Field. We will have a food vendor available for those who attend the rally. We will need volunteers for many aspects of the event so make your calendar and reserve the date.

Projects: Tim Anderson is still working on his Bearhawk. He has moved from tube to steel fabrication. He is currently working on the "tail feathers".

Jim Edwards: Jim has temporarily mounted the wings to build the wing root faring's. He has added the vents as well.

Matt Harris: Matt has decided to keep the RV9 project for now. He has ordered a used Lycoming O-320 for the RV. He is still working on the Ultralight.

Troy Wright: Troy has wires everywhere (hopefully with some kind of map). He is adding a second Skyview but needed a software update to have them both working. He has painted the interior components of the cockpit.

Old Business: Hanger lease renewals are all complete.

New Business: EAA approved our Flight Advisor. Travis Chlarson will serve our Chapter in that roll. He gave an overview of the position, which is designed to improve safety among members related to specific areas of flying. Thank you Travis, for volunteering.

Bill gave a report on the DART project. He said that there are 1200 pounds remaining to be delivered to the Kalispell Tribes still in Walla Walla. These are emergency supplies for COVID and other emergencies.

ALW-FBO: We have talked about doing an in-person meeting at some future time at the Walla Walla Airport or at Gorge Aviation (FBO). We have discussed a few ideas of types of meetings to have and where. Bill will continue to be in conversation with the Airport Manager and the FBO.

Program: Tim Anderson showed some video of his Kit Fox on skis flying at Martin Field since we have a nice snow cover this winter.

Meeting adjourned.

Respectfully submitted,
Don Gibbard, Secretary

Density Altitude *continued*

formance information should be the operational data section of the aircraft owner's manual or the Pilot's Operating Handbook developed by the aircraft manufacturer. In the example given in the previous text, the pilot may be operating from an airport at 500 MSL, but he or she must calculate performance as if the airport were located at 5,000 feet. A pilot who is complacent or careless in using the charts may find that density altitude effects create an unexpected—and unwelcome—element of suspense during takeoff and climb or during landing.

(adapted from FAA-P-8740-2)

Chapter Meeting Online

Our April Chapter meeting will be held as an online Zoom meeting on Monday April 12th starting at 7:00 p.m. You will receive an invitation to join the meeting from Ron Urban. There will be a link to the online meeting you can use with a computer, smartphone, tablet with video capabilities. If you do not have a camera on your computer you can still join online but you will need a microphone in order to join the conversation.

The second option is to dial in with any phone. There is a toll free number with the meeting ID and password in the line. If you can launch the call from your email, the link will in put all the necessary information. If you dial it directly from a phone you will need to follow the prompts for meeting ID and meeting Password.

Keep your email invitation handy as you login since it contains all the information you need to succeed.

If you have not used Zoom before, the link will prompt you to download the Zoom App. Follow the install directions.

Young Eagles flying event will be held this year on Saturday June 5 at Martin Field. The event is sponsored by the Blue Mountain Chapter 604 of EAA. The event will begin at 9:00 a.m. and conclude by 3:00 p.m. This is a large undertaking with an expected attendance of 150 flyers and their families. Such an event will require volunteers to manage many tasks including setup and teardown. We will need people for crowd control, registration, flight line attendants and group escorts. There is something for everyone to do so mark your calendar and plan to sign up for a position that best suits your skills.

There will be a food vendor on the grounds to provide lunch and refreshments to attendants and volunteers. Covid-19 restrictions and State guidelines will be followed so there will be some restrictions that we will need to enforce. Our planning team will define all the requirements on the morning of the event.

Pilots will have a Briefing at 8:30 a.m. to explain cockpit management, flight path, and safety procedures. This is an important part of what we do as a Chapter so please get involved. More details will be shared at our May meeting.

Best Glide *continued*

identify minimum sink speed, look for the highest speed forward that will give you the lowest rate of descent. Knowing these speeds will give you a couple of important numbers to have in the back of your mind should a situation ever warrant their use.

How Far Can I Glide?

How many miles you can glide per 1,000 feet of altitude is another very useful thing to know. A rule of thumb for Cessna 152s and 172s is 1.5 nautical miles per 1,000 feet of altitude above ground level. Consider experimenting to see how far your aircraft can glide.

Aircraft	Vx	Best Glide	Vy
C172	53	65	73
AA5A	78	83	91
PA 28 161	63	73	79

Not all manufacturers publish a best glide speed. Here's a few examples of some who do.

Forced Landing Tips

A good way to prepare for a forced landing is to practice power off approaches and landings at typical mission weights. This will keep your skills from getting rusty. Some pilots will choose a spot between the 1st and 2nd third of the available landing area for an initial aim point. As they see they can make that initial spot, they'll add flaps and perhaps slip the airplane to move the aiming spot to the 1st third of the landing area. This is done to reduce the chance of landing short or a final approach stall while trying to stretch the glide to the runway.

Position is Key

For any type of gliding approach, you'll want to reach a key position on base from which you'll know you can make a successful landing. Until the key position is reached, keep the airplane configured for best glide. After you pass the key position, add flaps and gear to configure the airplane for landing and fly the final approach at 1.3 times the stalling speed in landing configuration (1.3 Vso). The FAA's *Airplane Flying Handbook* contains several helpful diagrams for different power-off landing scenarios and corresponding key points.
(adapted from FAA Safety Briefing)