

**GA HANGARS BEING PAINTED AT SLC**  
SLCDA facilities maintenance painters are power washing and painting general aviation hangars on the east side of Salt Lake City International Airport. Due to weather and other considerations the process is taking longer than anticipated.

Properties Specialist Mike Rawson will contact tenants several weeks in advance to offer alternative tie-down space for tenants if they desire to move their aircraft during the painting process. Please allow approximately two weeks per row for the work to be completed.

Contact Mike Rawson at 801-575-2894 or GA Manager Steve Jackson at 801-647-5532 with questions.

**GA AIRPORTS' TAXIWAY SEALING COMPLETE**  
Taxiway and ramp sealing at South Valley Regional Airport (U42) and Tooele Valley Airport (TVY) is complete.

If friction tests and seal coat durability evaluations are satisfactory, SLCDA Engineers may consider seal coating runways at both airports.

The Department of Airports is interested in pilots' experiences or comments about operations on the newly sealed surfaces. Please contact Steve Jackson at 801-647-5532 or [steve.jackson@slcgov.com](mailto:steve.jackson@slcgov.com) with your comments or observations.

**DENSITY**  
by Hal Stoen

The runway lights roll by faster than your airspeed is increasing. A look over at the engine gauges shows that the manifold pressure is a little lower than you're used to, and the RPM is down a bit too. Still, the pre-flight inspection showed nothing unusual, and your run-up prior to departure was normal. And yet, here you are screaming down the runway, in your mind's eye going faster than you have ever gone before and you're still on the ground. The airspeed indicator slowly twitches up to your lift-off speed and you pull back on the wheel. The aircraft struggles into the air, a small turbulence bump makes the stall warning horn go off briefly.

You know your aircraft well, and have a mental picture of how much runway it will use, and how the deck angle is at climb. But here you are after eating up an unusual amount of asphalt on departure, and your climb angle is so shallow that you are barely climbing. What the heck is going on here? You know your aircraft very well and this is not performing like your aircraft at all!

Let's back up a bit here. It's a lovely summer day as you and three friends pile into your Speedmerchant 500, a normally aspirated (not turbocharged) twin-engine general aviation airplane. You're at a Denver, Colorado General Aviation airport, heading off for a weekend of mountain activities in Colorado's "Hill Country". You are a conscientious pilot, and are familiar with your aircraft. This is your first trip out West; to date all of your operations have been from airports in middle and eastern America.

So what went wrong?

**Density Altitude...** The air that we fly in is constantly changing. Winter and Summer, cold and dry, hot and humid. As these variables occur, the air density varies. And, most importantly, as the air density varies so does the performance of your aircraft. "Density Altitude" is the term used when these variables are taken into account. In our above example, as far as the Speedmerchant 500 was concerned you were departing at an airport that was thousands of feet higher than it actually was.

**Performance Figures...** But, what about the performance figures for the aircraft? They say that it will take off at so-and-so airspeed in so many feet. What about that? Well, "that" is a pretty much a fictitious day. It's called a "Standard Day" in airplane talk, and is used so that we have a common basis for discussing and comparing airplane performance.

**Standard Day...** A Standard Day is at sea level, with an outside temperature of 59 degrees (F), and an altimeter setting of 29.92 inches. As a pilot, you should have these numbers blazed in your mind, for if any of the three of them change your aircraft's performance will change too. And, looking back, how many times have you ever taken off from an airport at sea level?

**Briefly, About Humidity...** I remember a sports announcer saying one time "It's a hot and humid night out here at the old ballpark. Fly balls won't carry very far tonight, the air is so thick that you could cut it with a knife." Well, he was wrong.

Moist air is less dense than dry air. That seems to fly in the face of "logic", but it's true. Relative humidity is not taken into account in most Density Altitude calculations, but when it is at an extreme, it should be. At the end of this tutorial is a link that has a Density Altitude calculator that will factor in humidity.

**The "Three H's", Hot – High - Humid...** When any one of these atmospheric conditions is present it will have a significant effect on your aircraft's performance. If all three are present, take a very serious look at your performance tables.

For example, let's look at a Colorado airport that the Speedmerchant 500 was trying to get out of that hot summer day;

Outside air temperature: 96 degrees, F.  
Altimeter setting: 29.40 inches  
Dew point: 70 degrees, F.  
Field elevation: 5,100 feet

Given these numbers, the old Speedmerchant performs as if it were taking off from a field elevation of 9,400 feet... Wow!

And don't get the impression that this only applies to high-altitude operations. Given the same weather conditions, but at an airport with a much lower elevation of say 500 feet, the Density Altitude would still be 3,857 feet.

**The Airspeed Indicator and Density Altitude...** The beauty of the airspeed indicator is that it "compensates" for Density Altitude. All the pitot tube cares about is the number of air molecules that hit it. If the air is less dense because of Density Altitude, the pitot tube will just require that more air be rammed into it for a given airspeed... i.e., a faster relative airspeed due to automatic compensation.

**What Can A Pilot Do?...** First off, just be aware of Density Altitude and the severe effect that it can have on your aircraft's performance.

Have access to a Density Altitude chart/computer and use it.

Be aware of the fact that even after you get off of the ground that climb performance will be affected, and that if you lose an engine you may not be able to climb at all.

Consider either taking off early in the day, or later in the evening when the temperature is lower. Even commercial operations don't take place on a summer's mid-day at the infamous La Paz Airport.

Lower your gross weight by taking on less baggage, passengers, or fuel.

Pay attention to your engine gauges so that you do not exceed maximum temperatures. Density Altitude operations are stressful on power plants.

Virtually ignore the external visual cues that you are used to, and pay stricter attention to the airspeed indicator. Do not lift off prematurely. Be aware that your climb angle will be shallower and that your rate of climb will be considerably less than you are used to.

During the approach and landing phase in high Density Altitude operations be aware that your groundspeed will be considerably higher than you are used to because of your higher actual airspeed. Constantly refer to the airspeed indicator during approach and landing. Just as you use up more runway during takeoff, you will require more runway during landing. Avoid landing "long" as your ground speed at touchdown will be higher than normal and you will use up considerable real estate during the roll out and braking phases. The "ground effect" cushion will be decreased... landings tend to be a little more "firm" during high Density Altitude operations.

If you are operating a normally-aspirated piston-powered aircraft (non-turbocharged), do a full-power run-up before departure. Select an area that is clean so that the propeller won't pull up surface debris causing damage to blades. Set the parking brake. Stand hard on the brakes. Bring full power up on the engine(s). Slowly lean the mixture(s). As you do so, the RPM(s) will increase until they reach a maximum before starting to fall off again. Go back to the maximum RPM(s) and enrich the mixture to achieve 100 degrees on the EGT(s). This will eliminate the extra-rich condition brought about by the thin air of high Density Altitude, and just might be the edge in performance that you will need for a successful departure.

**And Lastly...** Be an informed pilot and fly safely.

## ***HELPFUL POINTS OF CONTACT***

**For GA operational, facilities maintenance, aviation newsletter, airfield, and SLC Title 16 questions call:** Steve Jackson, SLCDCA General Aviation Manager, 801-647-5532 or e-mail at [steve.jackson@slcgov.com](mailto:steve.jackson@slcgov.com).

**For hangar lease and repair questions call:** Mike Rawson, Properties Management Specialist, at 801-575-2894 or e-mail at [mike.rawson@slcgov.com](mailto:mike.rawson@slcgov.com).

**For aviation security questions call:** Connie Proctor at 801-575-2401.

**For gate access problems call:** Airport Control Center at 801-575-2401.

**For emergencies call: at SLCIA, 801-575-2405  
at TVY or U42, 911 then 801-575-2405**

### MORE INFORMATION ON DENSITY ALTITUDE

For an excellent Density Altitude calculator, visit website: [http://wahiduddin.net/calc/calc\\_da.htm](http://wahiduddin.net/calc/calc_da.htm)

For a discussion of a Standard Day, visit website: <http://www.usatoday.com/weather/wdenalt.htm>

### GA HANGAR INSPECTIONS SCHEDULED

General Aviation and corporate hangar inspections were started in June and will continue well into July. SLCDCA Properties Specialist Mike Rawson (801-575-2894) will mail remaining notification letters prior to July 10.

### ELECTRONIC GA NEWS

If you would like to receive the Salt Lake City Department of Airports' monthly general aviation newsletter by e-mail, send a request including your current e-mail address to: [steve.jackson@slcgov.com](mailto:steve.jackson@slcgov.com)

### UPCOMING EVENTS

Leading Edge Aviation Logan (LGU) - Leading Edge Aviation has a free breakfast in their hangar on the 2nd Saturday of each month from 8:00 am to 10:00 am. For more information about Leading Edge events, visit [www.leaviation.com](http://www.leaviation.com)

The Idaho Falls (IDA) Airshow is scheduled for July 24-25. Visit [www.idahofallsairshow.com](http://www.idahofallsairshow.com) for more information.

Wendover Airfield (ENV) is giving two for one casino buffet coupons with a minimum 10 gallon fuel purchase. The Wendover Airfield Airshow is scheduled for Saturday September 25. Visit [www.wendoverairbase.com/airshow](http://www.wendoverairbase.com/airshow) for more information

### FAA PILOT SAFETY SEMINARS

No FAA pilot safety seminars for July.

Additional information is available at [www.faasafety.gov](http://www.faasafety.gov) under "events" or contact Dennis Seals, FAA Safety Program Manager at 801-257- 5056.



**Fly smart - fly safe - fly neighborly!**