Stan/Eval Newsletter
CIVIL AIR PATROL
UNITED STATES AIR FORCE AUXILIARY
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Shock Cooling, in the Traffic Pattern? (Lt Col Jerry Proctor, AZWG)

I am not an expert on Shock Cooling. I have listened to countless discussions and read a lot about the good and bad of the subject. I have heard that the biggest piston temperature shock/change is on take-off roll. To go from idle to full throttle, one must wonder.

I have owned three Mooney aircraft and adopted a middle of the road position on shock cooling. My method is far from scientific, but it worked well for me. I hope my title is not disrespectful but here it is. Treat my engine like a Lady.

This means, I did not do engine run ups at 1800 RPM, I used1600, (however, for CAP I follow the POH checklist for 1800 RPM) primarily to protect the prop but also to be nice to the engine. Second, on take-off roll, I never jammed the throttle forward. I perform a nice deliberate push but far from a jam. Also, I did not take forever to get full power in, as I have occasionally and agonizingly watched others do. Climb out, once above 1000 feet AGL, reduce power and watch temperatures. All my Mooney's were turbocharged so temperature watch was important.

Recently, I flew with a very focused and proficient young CAP pilot. Although he was a little nervous as this was a check ride, I could easily see he was a fine pilot. We did the usual suspects of maneuvers and then pattern work. On the second pattern, it hit me that this pilot was opening and closing the cowl flaps on every circuit. This was an upper 80s-low 90s day in AZ and on go around he would not only reset the flaps, but open and or close the cowl flaps every circuit. I was thinking, when did he close them? It wasn't long that I found out. Abeam his landing point, he fully closed the cowl flaps. I then asked why he was doing this. He stated it was to prevent shock cooling. What? I simply said leave them open and we will talk this over on the ground.

In the after-flight debrief, I asked him why he was opening and closing the cowl flaps while in the traffic pattern. His answer was one of his CFIs said to do so. So, I took some time to describe the engine in the traffic pattern. Yes, on take-off roll, have cowl flaps open but as you turn cross wind and start to level on the downwind, you reduce the power, right? So, you set your power at say 18 inches MP. Then, the rest of the downwind is flown at 90 KTS and 18 inches or so power. How hot are the cylinders on the downwind? He hadn't ever noticed but he guessed not much. So, then you reduce power some more to begin your descent. Is there really a huge temperature difference when turning base and final? The answer is no. Thus, this procedure adds an unnecessary and potentially distracting step in a go around. So, he agreed with me and will not do so in the future.

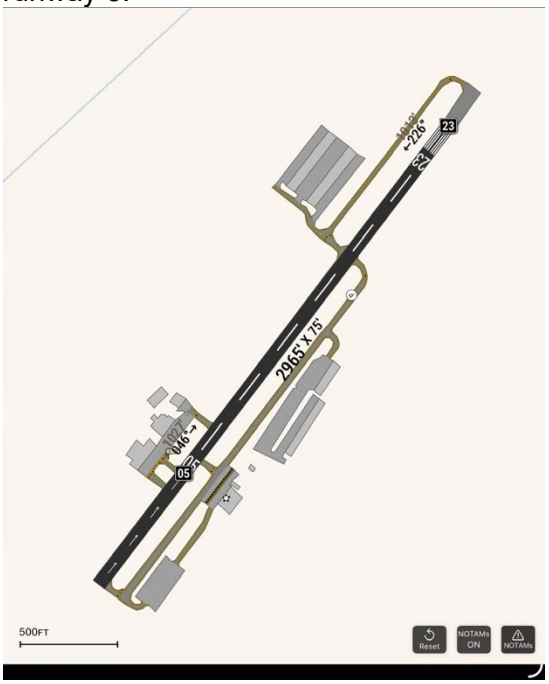
Yes, there are times to be careful not to cool the engine too fast. After a long high-powered, high altitude, flight, try hard to reduce power gently (Treat her like a Lady) and not dump the power and put it in a high-speed nosedive. So common sense and a little gentle consideration of the engine. However, to do so in the traffic pattern is certainly not necessary, particularly when there is plenty else to do when doing bounce and goes.

Fly safe

Fly a Stabilized Approach. Never Compromise! (J. Price, The Mooney Flyer)

(Ed Note: Although this was written to a Mooney audience, the basics are the same for our CAP aircraft)

A 64-year-old Private Pilot in his Mooney M20K was enroute to his destination when he encountered low cloud cover and decided to divert to an alternate airport. He chose an airport in West Virginia (FAIRMONT MUNI-FRANKMAN FLD (4G7)) because it had calm winds, clear skies and 10 miles of visibility. Also, Fairmont seemed to have sufficient runway length (2,965'). The pilot overflew Fairmont to assess the conditions, then entered the traffic pattern for a landing on runway 5.



As the pilot turned from base to final, he realized that he was too fast for a stabilized approach. However, rather than execute a go-around, the pilot elected to continue the approach. He told investigators that the airplane touched down "too far down the runway." A witness reported that it landed beyond the last crossing taxiway, leaving 836 feet of runway remaining.

After touchdown, the pilot briefly applied the brakes, but he realized that the airplane was traveling too fast to stop safely, so he added power and attempted a go-around. The engine responded, and he retracted the flaps. During the climb-out, the airplane struck trees and then impacted the ground. The fuselage and left wing were substantially damaged. The pilot suffered minor injuries, and the passenger was seriously injured.

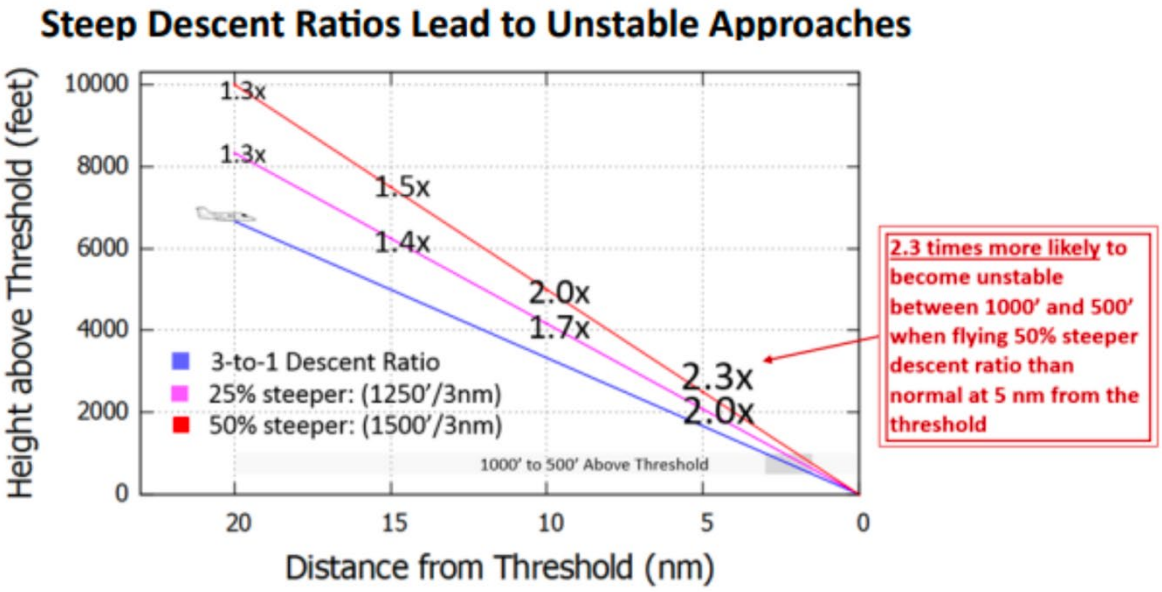
Probable Cause: The pilot's failure to attain the proper touchdown point, and his delay in aborting the landing.

What is a stabilized approach?

A pilot is flying a stabilized approach when he or she establishes and maintains a constant angle glidepath towards a predetermined point on the landing runway. Every runway is unique, but a commonly referenced optimum glidepath follows the "3:1" principle. The principle, also seen as a descent ratio, means that for every 3 nautical miles (nm) flown over the ground, the aircraft should descend 1,000 feet. This flightpath profile will simulate a 3° glideslope.

The Aviation Safety Information Analysis and Sharing (ASIAS) program, a collaborative government and industry initiative, recently completed a high-energy approach analysis by comparing actual stable and unstable approaches of business aviation operators using the common 3:1 descent ratio. The study looked at this relationship from four distances: 20, 15, 10 and 5 nm from touchdown. The study highlights the importance of being aware of how you manage the aircraft's total energy – kinetic (velocity) plus potential (altitude) – as you begin to fly

the approach. Flights that were above the “3:1” descent ratio, and not stable, often had high rates of descent and high approach speeds.



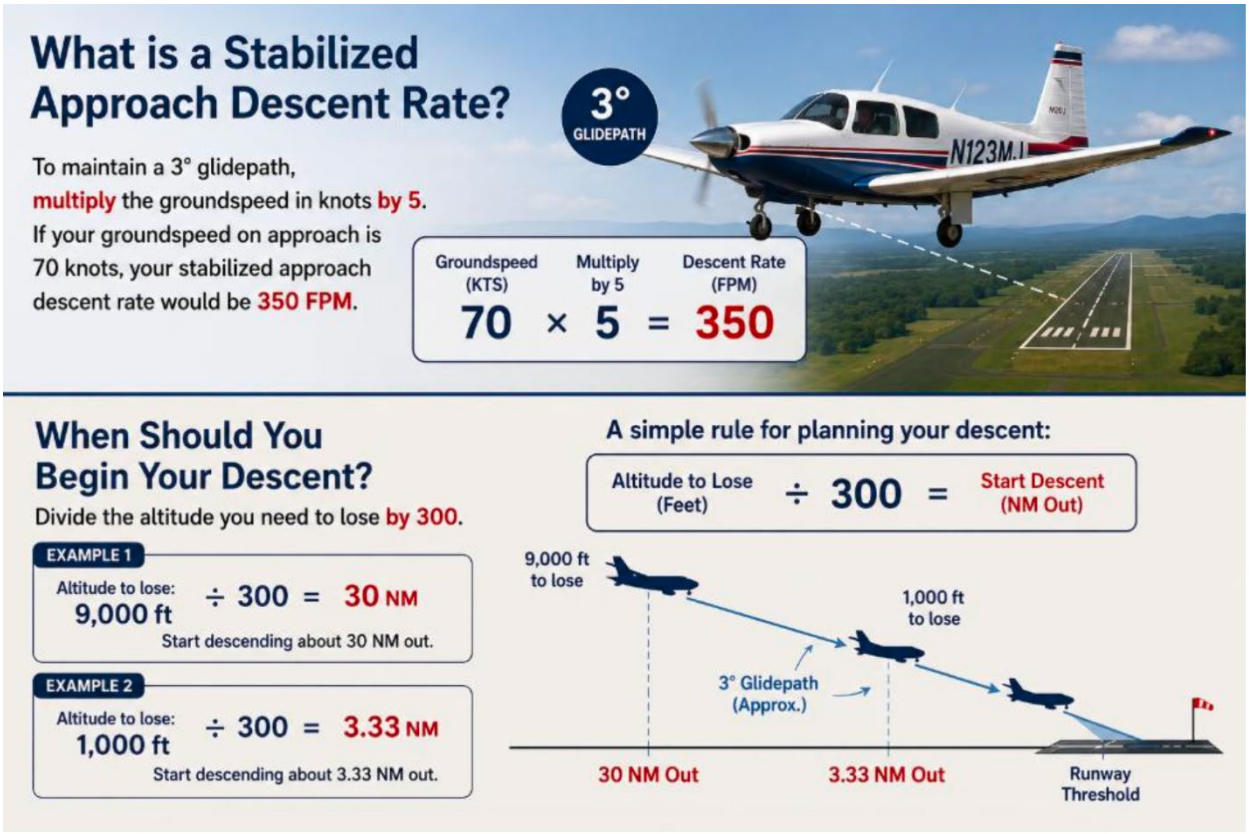
A deeper look at the analysis shows that, even at 20 nm from touchdown, when a flight is above the optimum “3:1” descent ratio, the approach is more at risk of being unstable when closer to the runway (i.e., 500 feet to 1000 feet height above touchdown (HAT)). The probability of being unstable can DOUBLE as you increasingly fly above a “3:1” flight path profile.

What is a Stabilized Approach Descent Rate?

- To maintain a 3° glidepath, multiply the groundspeed in knots by 5. For instance, if your groundspeed is 70 knots, your stabilized approach descent rate would be 350 FPM.
- When available, you should use a visual approach system such as a VASI or PAPI, or precision instrument approach to help maintain glidepath.

When Should You Begin Your Descent?
Divide the altitude you need to lose by 300. For example:

- If you need to lose 9,000 feet, start descending about 30 NM out.
- If you need to lose 1,000 feet, start your descent 3.33 NM out.
- Before you commence the approach, be mindful of how you are flying an approach, not just when you are close to the runway.



VMC Check at 500 feet AGL / IMC Check at 1,000 feet AGL
Are you:

- Configured for landing and completed all checklist items?
- On the correct flight path?
- At the correct approach speed?
- At the correct descent rate?

If you choose to continue with an un-stabilized approach, you risk landing beyond the touch down zone, too fast, out of alignment with the runway centerline, or otherwise being unprepared for landing. These situations can result in loss of control of your aircraft or a runway excursion.

Turning an Engine Failure into a Familiar Traffic Pattern (LtCol P. Kerr, LAWG)
"Fly the airplane first."

Every pilot has heard those words, and they are absolutely correct. Yet when an engine suddenly goes quiet, many pilots immediately begin thinking about restarting the engine, troubleshooting the problem, or trying to stretch the glide to an airport. Adrenaline narrows attention, and the orderly world of normal flight quickly becomes chaotic.

There is another way to think about engine failure. Instead of asking, "Where am I going to land?" ask, "How do I get to a key position from which I can fly a familiar traffic pattern to my chosen landing area?" That subtle shift in thinking transforms an emergency into something every pilot practices on nearly every flight.

What Is the Key Position?
The "key position" is a point abeam the intended touchdown point, typically on a downwind leg, from which the pilot can complete a power-off approach. Military aviators have used this concept for decades, and glider pilots rely on it every time they land. Yet many general aviation pilots receive only limited exposure to the technique after earning their certificates.

Rather than making one continuous descending turn toward a field, the pilot first flies to a position resembling midfield downwind before completing a normal base and final approach.

- The geometry is familiar.
- The workload is reduced.
- Most importantly, options remain available.

When the engine fails, priorities remain unchanged:

- Fly the Airplane: Maintain aircraft control.
- Establish and maintain best glide speed.
- Select a suitable landing area.
- Fly toward a key position.
- Accomplish the appropriate emergency checklist as time permits.
- Contact ATC, declare an emergency, and ask them to send help.

Notice that troubleshooting the engine comes only after the airplane is under control and headed somewhere useful.

- Altitude is time.
- Time is options.

Why the Key Position Works: You Fly a Pattern You Already Know.

- Every landing you've ever made has involved some version of a traffic pattern. The sight picture from downwind, base, and final is deeply ingrained through repetition.
- Instead of inventing an approach while under tremendous stress, you fly a pattern your brain already recognizes. Familiarity reduces workload, reduces stress and allows better decision making when it matters most.
- It gives you time.

Immediately after an engine failure, heart rate increases, breathing changes, and decision-making can suffer.

Flying toward a key position creates a brief period during which nothing dramatic has to happen. The airplane is trimmed. Best glide is established. A landing site has been selected. Now the pilot has precious seconds to think rather than simply react. Those few moments often make the difference between a rushed emergency and a controlled off-airport landing.

Downwind Becomes Your Reconnaissance Pass

One of the greatest advantages of arriving on downwind is the opportunity to inspect the landing area before committing to it.

Questions become easier to answer.

- Which direction is the wind?
- Is the field actually level?
- Are there power lines or fences?
- Are there irrigation ditches?
- Is the surface muddy?
- Are livestock or vehicles present?
- Is another nearby field actually better?

Many hazards cannot be identified until viewed from the side. Downwind provides that perspective and options remain open.

Suppose you initially selected a hay field. As you arrive abeam your intended touchdown point, you discover irrigation equipment, a fence crossing the field, standing water, or power lines that were invisible from a distance. Because you're flying a traffic pattern rather than diving directly toward the field, you can simply continue a little farther and sidestep to another suitable landing area. In other words, if you set up for a key position, you still have options.

Good energy management preserves flexibility.

Avoid the "Impossible Stretch"

Pilots who point directly at the touchdown point often become committed too early. If they realize they're low, the temptation is to stretch the glide by raising the nose. History has shown repeatedly how dangerous that can become.

Conversely, if they arrive high, they may resort to steep turns or rushed maneuvering close to the ground.

A key-position strategy encourages conservative energy management. It is almost always possible to dissipate excess altitude, and it is always impossible to recover altitude that no longer exists.

Think Like a Glider Pilot.

Glider pilots rarely know exactly how much lift or sink they will encounter during an approach. Rather than aiming directly at the touchdown point, they position themselves where they know they can complete the landing, then adjust as necessary using slips, S-turns, or changes in pattern geometry. General aviation pilots can adopt the same mindset. The objective is not to arrive at the field. The objective is to arrive in the proper position to land safely.

Practice Before You Need It.

The first time to think about key position should not be after an actual engine failure. During routine flights, ask yourself: “If the engine quit right now, where would my key position be?” Practice simulated engine failures not only to airports but also to suitable fields and open areas. Learn how altitude translates into pattern spacing. Develop the judgment that comes only through repetition. Like every emergency procedure, this one becomes more effective when it has been practiced before it is needed.

Every Emergency Is Different.

No single technique fits every emergency. An engine failure immediately after takeoff may leave insufficient altitude to maneuver to a key position. Terrain, weather, obstacles, or traffic may dictate another approach. The goal is not rigid adherence to a particular pattern. The goal is arriving over your chosen landing area with options instead of commitments.

After the Airplane Stops.

The emergency isn’t necessarily over when the airplane comes to rest. Take a deep breath and resist the urge to immediately climb out. Unless there is evidence of an immediate hazard—such as fire, smoke, a significant fuel leak, electrical arcing or another condition that threatens the occupants—there is usually no benefit to rushing an evacuation. Instead, take a few moments to assess the condition of everyone on board.

A firm touchdown or collision with terrain can produce compression injuries to the spine or neck that may not be immediately apparent. Ask each occupant if they have any pain, numbness, tingling or weakness. If anyone complains of neck or back pain, or even suspects a spinal injury, they should remain as still as practical until emergency medical personnel arrive, provided the aircraft remains a safe place to stay. Unnecessary movement can worsen an injury that might otherwise be manageable.

Once you’ve determined there is no immediate danger, notify rescuers of your location. If cellular service is available, call 911. Even if your phone cannot connect to the cellular network, it can often still display your GPS coordinates through its location services. If you are unable to reach

911 by phone, transmit on 121.5 MHz, the international emergency frequency. Advise any aircraft or air traffic facility that hears your call of your situation and ask them to relay your position and request emergency assistance. Your priority is no longer flying the airplane—it's ensuring that help can find you as quickly as possible while you and your passengers remain safe.

Final Thoughts.
The best emergency landings rarely happen because of extraordinary stick-and-rudder skills. They happen because the pilot slows the situation down mentally.

Flying to a key position transforms a frightening emergency into something familiar: a power-off traffic pattern. It provides time to think, an opportunity to evaluate the landing area, flexibility to change plans, and a stabilized approach to touchdown.

A successful off-airport landing isn't measured by whether the airplane flies again. It's measured by whether everyone survives—and, if injured, receives the proper care without making those injuries worse. Once the airplane stops moving, your role changes from pilot to incident commander. Protect your passengers. Assess injuries. Communicate your location. Stay with the aircraft if it is the safest place to remain.

When the engine goes quiet, your goal is not simply to reach a field. Your goal is to arrive in the right position to make a good landing—and to ensure that everyone goes home.

Articles for the National Stan Eval Newsletter
These articles have been written to present ideas, techniques, and concepts of interest to CAP aircrews rather than provide any direction. The articles in this newsletter should in no way be considered CAP policy. We are always looking for brief articles of interest to CAP aircrews to include in this newsletter. CAP has many very experienced pilots and aircrew who have useful techniques, experiences, and tips to share.

Please send your contribution to stephen.hertz@vawg.cap.gov . You can view past issues here.