

SAFETY GRAM 4.0


January 2023



Air Force Aero Clubs,

Aero Clubs recently had a landing gear-related accident (LGRA) in one of our retractable gear aircraft. The incident is under investigation and the Center will try and produce a mishap brief to review once available. Saying that, I thought it would be important to review some information regarding LGRAs as it relates to retractable gear aircraft. I have attached a short article for everyone to review and apply its concepts to your club's retractable gear aircraft (if available). I think the article does a pretty good job presenting strategies on how to avoid having a LGRA in retractable gear aircraft by focusing on instruction and having a thorough understanding of that system prior to being checked by club instructors to fly for training or recreationally. Even if your club does not have a retractable gear aircraft these concepts are important to learn and can be applied to a multitude of other scenarios. Bottom line be sure you have a thorough knowledge base on how the aircraft you are flying operates and understand procedures if a system malfunctions.

Fly Safely,

A handwritten signature in black ink, appearing to read 'Jonathan F. Koch', written in a cursive style.

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AVOIDING GEAR-UP MISHAPS

Training is a key to preventing this common accident type

BY THOMAS P. TURNER

It was the end of a long day instructing in a new Beech Baron. We were on a left downwind to Wichita Mid-Continent Airport in Kansas when I reached up and reduced throttle on the left engine to simulate an engine failure. As expected, the familiar "beep, beep, beep" of the landing gear warning horn sounded as the throttle moved toward idle.

The drill was to have the student identify and secure the failed engine and then land with the "dead" engine set at zero thrust. But there was a catch. It was windy and turbulent (we were in Kansas, after all); turning base and then final, the Baron's groundspeed slowed to a crawl. We were on about a half-mile final when I realized that the pilot had forgotten to lower the landing gear — and I'd forgotten to check. The low groundspeed and turbulence resulting from the strong low-level winds conspired to make airplane performance appear as if the gear was down.

It can happen to anyone. Conditioned after years of giving engine-out training to ignore the gear warning horn, that safeguard did not hold my attention. Luckily I caught the oversight in time, and since then I've dramatically changed the way I look at, and teach, landing gear extension. If you're like me, your introduction to retractable-gear airplanes consisted of three or four landings before you were sent off solo — but the record shows that a few times around the patch might not be enough to prepare students to avoid gear-up landings.

"Those who have..."

"There are those who have, and those who will." How often have you heard that said when talking about landing retractable-gear airplanes with the gear up? This statement is a fine example of the "resignation" mindset — that a gear-up landing is inevitable, and there's nothing we can do to avoid gear-related mishaps. Instead, let's teach this mantra to our retractable-aircraft students: "There are those who have, and those who won't."

Landing gear-related accidents (LGRAs) in retractable-gear airplanes are commonplace. That's why we all know the "those who have" cliché. FAA preliminary incident reports show that more than half of all accidents involving piston retracts are LGRAs — often as many as six or seven a week. Because they rarely cause injury or reportable damage (most LGRAs don't meet the requirements for a National Transportation Safety Board report or investigation), they're seldom reflected in the statistics used to compute the general aviation safety record. Yet the average cost of repairing an airplane involved in a LGRA runs in the tens of thousands of dollars. And although they rarely cause injury or total an aircraft, they may render the pilot uninsurable for up to five years.

How they happen

LGRAs come in three types:

- The "oops, I forgot," or classic gear-up landing (like my near-LGRA experience).
- The gear collapses on the landing roll, but not because of any known mechanical problem. Chances are the squat switch failed when the pilot inadvertently put the gear switch in the up position. A side load during a too-vigorous turn may open the squat switch momentarily, allowing the gear to retract.
- The true mechanical failure, in which there's nothing that can be done from the cockpit to completely extend the gear.

Historically, LGRAs are about evenly split between the first two scenarios, with a comparatively few true mechanical failures thrown in.

In many cases strong surface winds or other distractions (like doors open in flight or electrical failures) are contributing factors in the "oops"-style gear-up landing. Gear collapses very often result when a pilot is in a hurry to clean up the airplane during the landing roll, or while performing a touch and go, and inadvertently moves the landing gear handle instead of the flap switch.

...And those who won't

How can flight instructors teach students to avoid this all-too-common type of mishap?

- Let your students know about the threat. Simply being aware there's a hazard may make pilots work harder to avoid it.
- Spend time on the retractable-gear checkout. Take time to introduce proper landing gear extension and verification discipline, and practice it enough that the patterns become second nature to the student. Have your student perform the emergency landing gear extension procedure (using the checklist) as part of the checkout.
- Review the pilot's operating handbook with your student. Teach using a prelanding checklist (printed and/or mnemonic), and reinforce using it in the cockpit. Make sure he or she knows how the gear system works and how to manually extend the gear if it doesn't.
- Insist on verification. Drill your student not only to lower the landing gear, but also to confirm that the gear goes down and locks. I like to hold onto the gear extension switch as a reminder until I have the time to scan the down-and-locked indicators. Many airplanes have external mirrors that allow you to see when the gear is down, and in high-wing designs you can see at least the main wheel on each side of the airplane. Teach students to ask passengers to confirm the visible wheel on the other side — to report "I see a tire."
- Introduce distractions during retractable-gear training. Make sure your student can remember to lower the gear when other things intrude on his or her attention. Often students will forget to extend the landing gear during practice emergency landings. They make the runway or emergency field in fine fashion, only to be faced with an unfortunate surprise at the end.
- Teach that, on landing, the pilot should not reconfigure the airplane until it comes to a complete stop. In almost half of the LGRAs the pilot inadvertently retracts the gear during the landing roll in the rush to clean up the airplane. Landing gear squat switches are supposed to prevent gear movement when there's weight on the wheels, but FAA reports show they don't always do so.
- Avoid touch-and-go practice in retractable airplanes. A lot happens in a very short time during a touch and go, and many times the pilot inadvertently retracts the landing gear (instead of flaps), causing a mishap. Make all your landings full stop to reinforce the discipline of stopping before reconfiguring the airplane.

- Don't try to perform a checkout in an airplane with which you're not completely familiar. Do yourself and your customer a favor by referring him or her to an instructor expert in their airplane's operation, if you're not familiar with the type.
- Be vigilant. As an instructor you're the last line of defense in avoiding a gear-related accident.

Landing gear-related accidents put pilots at physical and financial risk, remove good airplanes from the active inventory, and result in increased insurance cost as underwriters pay to repair airplanes. It can happen to any of us if we let our guard down. Landing-gear discipline requires a completely new set of traffic-pattern and instrument approach skills for pilots used to fixed-gear airplanes, and gear procedures for one make of airplane may differ significantly from another. Spend as long as it takes in the airplane when conducting a retractable-gear checkout or transition, so your student will join the ranks of those who won't.