

CALLBACK

From NASA's Aviation Safety Reporting System



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Gear Up Landings – Getting a Handle on the Problem



Over the past five years, ASRS has received an average of 60 gear up landing reports per year. Gear up landings rarely meet the damage or injury requirements for a National Transportation Safety Board (NTSB) report or investigation and they are seldom reflected in general aviation safety statistics. Nevertheless, no pilot wants to experience a gear up landing. There is always the potential for a serious outcome and the repair costs associated with any gear up landing can be substantial.

To avoid the risks and costs associated with gear up landings, pilots can get a handle on the lessons offered in these ASRS reports.

Scrape and Go Landing

A malfunctioning gauge, failure to use a checklist and the absence of a gear warning horn were all factors in this blade-bending low approach.

■ *A Student Pilot and I were performing practice landings in a C172RG. On the upwind of a touch and go we noticed that the manifold pressure gauge was reading atmospheric pressure no matter what the throttle position. The engine was still performing normally, but we decided to make the next landing a full stop. I took the controls momentarily on the start of the downwind so that the Student could tap the gauge. We exchanged controls again and requested a full stop. We were performing short approaches and got clearance for another short approach. The Student reduced throttle (the manifold gauge still read atmospheric pressure) and selected flaps to 20 degrees. We touched down gear up, the Student added power and I took the controls and put the gear down.*

As I climbed out, an aircraft in the run-up area notified Tower about what had just occurred. Tower asked if we needed any assistance. The plane was flying normally so we declined, obtained a clearance to land and flew the pattern. I flew the aircraft, performed a soft field landing and taxied back. Upon shut down it was found that the prop did strike the ground.

There were several human factors involved.... I failed to verify that the gear was down with my own checklist. I also relied on the aircraft too much to warn us that the gear was not down, but due to the fact that the manifold pressure was at an atmospheric level and the flaps were only at 20 the horn did not go off.

The cause of the prop strike was lack of checklist usage, lack of communication during the exchange of controls, fixation on the inoperative instrument, complacency, and failure to verify that the gear was down.... Also, we should have notified Tower of the manifold pressure situation. It might have slowed us down in the cockpit as well as drawn attention to us by the Tower who may have notified us that our gear was still up.

A Hull of a Mess

Switching from wheels up for water landings to wheels down for hard surface landings requires an extra measure of attention for pilots of amphibian aircraft. A series of water landings followed by distractions on final contributed to this Amphibian Pilot's off-lake, gear up landing.

■ *I was supposed to have a Biennial Flight Review (BFR) and insurance re-currency flight in an aircraft that was right out of annual inspection.... I had not flown in 12 months so I was rusty and my Instructor was aware of this. We got in the air and did some pattern work. After about six landings we departed the airport to do some water landings and taxi work.... I proceeded back to our departure airport and was given a straight in approach for the runway. I was distracted with a logbook issue along with the fact that I would not be able to get my plane back to its base because I was not night current. We got into a conversation on how to proceed while I was on short final. We were both distracted and not going through the checklist and landed on the hull, gear up.*

I know that I share some blame on this because I know better than to be distracted in the cockpit.

If at First You Do Succeed...

It is never a good idea to second guess a landing gear warning indication. You might get away with it once or twice, but as this Bonanza 36 Pilot learned, there are times when it is not prudent to try, try again.

■ *The aircraft had been sitting in the owner's hangar for several months without activity and I had been asked to fly it. The records available and the preflight all seemed excellent and all went well until I was to land. I did not get the gear down indication. I asked the Tower to visually check my gear and they suggested a low pass.... As I turned crosswind I could see my shadow on the ground and I could see that the gear was indeed down. As I passed the Tower I did not get a transmission from them. I proceeded to land as previously instructed and noticed that the radios were failing which explained why I had not heard from the Tower. I landed without incident and followed an operations vehicle to the main ramp and my hangar.*

I discovered that the problem was loss of battery power and alternator output.... The electrical problem was corrected during the evening by re-charging the battery. I felt this had explained the gear indication problem and the radio failures.

On the following day... the Before Start and Taxi Checklists were completed and it was noted that all systems were functioning and three green lights with gear down were noted. Subsequently the flight proceeded to a nearby airport. I planned to use this uncontrolled field to do several takeoffs and landings to become familiar and current in the aircraft. On the first landing I did not see three green gear lights, but there was no gear warning horn. Based on having had this same scenario the day prior, I continued and landed without incident. Because of a change in winds I decided to switch runways for the next takeoff and landing. This was accomplished with the same experience of no green gear down lights, but also no gear up horn. Becoming uncomfortable with this condition, I decided to return to my final destination for resolution of the discrepancy.

I was cleared to enter a visual right base.... When I put the gear down I heard no gear horn, but I did not see three green lights. The aircraft settled to the runway level and slid straight ahead. The gear were actually partially extended, but apparently not locked. I immediately exited the aircraft having shut the fuel off, closed the mixture and turned off the battery, alternator, and ignition. There was no fire or smoke, and I stood on the runway awaiting assistance.

Before flying an aircraft that had been so long in storage, maintenance personnel should have been consulted and an

inspection and survey of the aircraft for proper airworthiness should have been made. My unfamiliarity with the aircraft was certainly a factor also.

What Goes Up, Doesn't Always Come Down

Troubleshooting an electrical problem, a C210 Pilot, accompanied by a Maintenance Technician, cycled the landing gear a few times and then lowered and verified the gear down for a final landing. In an effort to make one last check, the gear was cycled again. Unfortunately, only half of the cycle was completed.

■ *The aircraft had just come out of repair for a failed alternator. Upon starting the engine the alternator again failed, but after shut down and restart, it worked until just after takeoff then failed again. So I landed uneventfully and returned to the FBO. During taxi the alternator restarted then briefly failed again. The Mechanic offered to come with me for a test flight to see if an over-voltage transient could be triggering the problem. At his suggestion, we stayed in the traffic pattern, cycling the gear up and down a few times, but could not duplicate the problem. After the first touch and go we still hadn't seen a problem. On downwind, I lowered the gear as usual and did a GUMPS* check. The Mechanic then suggested cycling the gear once more. I raised it, but failed to lower it. Just before touchdown, the Tower noticed the lack of gear and called for a go-around, but it was too late and we landed gear up with full power.*

Lessons: 1) Do maintenance work at altitude away from the airport 2) Maintain a sterile cockpit in the pattern and, 3) Do a GUMPS check on final.

*GUMPS is a commonly used acronym that is used as a final check to ensure that an aircraft is properly set up for landing. It should not be used as a substitute for the specific aircraft's descent, approach, and landing checklists.

Gas (fullest tank)

Undercarriage (gear down and locked)

Mixture (full rich)

Propeller (high RPM)

Switches (fuel pumps, magneto check, landing lights, etc.)

C-GUMPS can be used when flying a plane with a carbureted engine; "C" standing for Carburetor (heat on).

ASRS Alerts Issued in February 2013	
Subject of Alert	No. of Alerts
Aircraft or Aircraft Equipment	4
Airport Facility or Procedure	3
ATC Equipment or Procedure	5
Company Policies	1
TOTAL	13

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February 2013 Report Intake	
Air Carrier/Air Taxi Pilots	3769
General Aviation Pilots	966
Air Traffic Controllers	744
Cabin	252
Mechanics	145
Dispatcher	63
Military/Other	21
TOTAL	5960