



GUMP – Do It and You Will NEVER Land Gear Up!

By Alan C. Davis – MCFI Emeritus

Before beginning this piece, it is important to know that I normally never use the words “always” or “never”. I have found in my teaching work that definitive words like always and never can almost always get one in trouble. Someone will find the exception and the effort at using the words for instructional value is then lost – as is the trust of those toward whom the instruction was directed. For that reason, my normal lexicon consists of qualifying words, many of which end in “ly” – like normally, usually, generally, etc. Remember the opening sentence? If not, go back and check it out – then re-read the title.

I have made it a practice to let all of my students know of this. The purpose is to make sure they understand that when I rarely use a word like always or never ... I truly mean it. In fact, on the few occasions when I have used one of them, since fully understanding the importance of the “ly” or other modifiers, I have challenged my students to find the exception(s) in print, and if they did, I would eat it – with salt and pepper. To date I have not had to do so. This means, of course, making sure your homework/research is well done first!

The genesis for this article came from a column in a really great safety blog – Mastery Flight Training, Inc. (mastery.flight.training@cox.net) – done by MCFI Thomas Turner, who was also the 2010 National FAA Team Rep of the Year and the 2008 Central Region CFI of the Year. His blog deals with safety issues that need to be addressed or reviewed or dealt with further by the aviation community and especially the flight training community – and I highly recommend it. In his 10/24/12 edition he spent some time dealing with the issue of LGRMs (Landing Gear Related Mishaps – most of which are gear up landings), which continue to be a cause of concern. As Tom indicated in that piece, it was prompted by a person who had been involved in such an event and who had come to him about it. What was revealed, amongst other things, is that very little of these types of situations wind up in the reports that we see because in most cases they are not covered in NTSB 930 reporting.

LGRM events, as Tom notes, are often in the range of 10 or more a week ..!!! The resultant damage to airframes, propellers, and engines get into big numbers really quickly, especially with retractable gear aircraft in the price ranges we now see them, and the resultant repair cost can often total the aircraft – with the insurance industry often paying over USD \$1 million – PER MONTH related to LGRMs. The most revealing comment was that LGRMs occur “without regard to gear switch location or gear warning or safety devices.”

The literature is replete with examples that run the full gamut of “reasons”. These include failure to use a checklist, failure to complete a checklist, interruption of the checklist, and many more checklist related “reasons”. They also include examples of what we call “subtle incapacitation” situations in which, for example, the pilot lands with the gear horn blaring and simply does not recognize or respond to the safety warning that has been built

into the aircraft. They fly it right to the ground without recognizing the problem until the metal scraping sounds begin and the curling of the prop tips has started. This includes those situations in which the pilot realizes the problem at the last moment but cannot stop the sink rate to the runway in time – even with application of full power.

There are many “simple” solutions to LGRMs – the best of which is making sure that the checklist is used in its entirety, and, if it is interrupted, going back to the start of the list rather than assuming that you know where you were and what was already done. (That’s what happened in the DC9 crash in Detroit many years ago.) But, we have, as a group, such “get there-it is” that we will even rule out a simple maneuver – the go-around, to get away from the airport and get things back in order – and instead continue to the LGRM.

Human factors are definitely an issue, and much thought has gone into that phase of the problem over the years. That has included gear switch design & placement, gear light design & placement, and the warnings that we receive when the gear is still up and the power is reduced below a specified level. The latter, along with deflected pilot attention, was part of the cause of Eastern 401, an L1011 which crashed in the Florida Everglades because the warning of the autopilot disconnect was not sufficiently “noisy/raucous” to bring the crew out of their concentration on things other than flying (a human factors problem itself!). There were NO malfunctions of the aircraft itself to cause that crash!

So, what can we do to stop this problem dead in its tracks? In this case, of course, the LGRMs to which we now refer are NOT the result of mechanical gear failure – all the ones to which we refer are aircraft with fully and properly functioning landing gear systems – and, supposedly, fully conscious pilots as well. There are, of course, the standard items like using standard procedures and avoiding the non-standard, but we know that those non-standard procedures are going to happen from time to time. We can also prevent them by full and proper use of the checklist, but we’ve already indicated that that has not stopped the problem.

Thanks for bearing with me for so long so I could set the stage for this next section and my “NEVER” statement in the title of this article. Do you remember being taught the GUMP check when you were in training? GUMP = Gas, Undercarriage, Mixture, Prop. It is the last and final check that should ALWAYS (there’s one of those words!!) be done on final in EVERY approach to EVERY landing. It makes no difference what type of aircraft you are flying – fixed or retractable gear, fixed or constant speed prop – and that is where we have perhaps failed in the instruction process. Because so many early trainers are fixed gear & prop, the GUMP isn’t done because it seems ... irrelevant. Doing a “GM” check just doesn’t do it for most of us. But, will we always be flying that type of aircraft?

Here it comes, folks.

IF YOU DO A GUMP CHECK ON EVERY APPROACH TO EVERY LANDING, REGARDLESS OF WHAT TYPE OF AIRCRAFT YOU ARE FLYING AT THE TIME, IT WILL BECOME SUCH A HABIT THAT YOU WILL DO IT EVERY

TIME – EVEN IF YOU MIGHT MISS SOMETHING ON THE CHECKLIST – AND YOU WILL NEVER LAND GEAR UP!

That is a pretty brazen statement to make, but think about it. There are two factors that make it a solid statement, and both of those are related to the word EVERY. This cannot be taken lightly and it MUST be done on EVERY approach EVERY time, and done until such time that it becomes automatic and does not require thought – it is a habit, but not a rote item. By nature, we do things that are habitual with a minimum of additional thought required – often without any thought at all and when other things are going on at the same time. BUT, and this is where the danger comes, it must be conscious enough that we can recognize and react to the variance when it does occur. It is not a “SAY” item, but a “DO” item on EVERY approach EVERY time, and if that is done – absent a gear malfunction – you will NEVER land gear up. Period!

I recall that in my early training at a school that no longer exists, they put dummy gear switches in fixed gear aircraft to help drum that routine and process into us from the start. The reason was that in their program we would very soon progress to a retractable gear aircraft, in which we would fly solo, and it taught the procedure and lowered their insurance rates as well. A gear switch is not necessary, however, to develop the pattern – only the development of the process and the commitment to it being done EVERY time. In fact, input from Russ Still (Master CFI) of Gold Seal Flight in Atlanta indicates that he has his students “physically move their hands to the panel (where the gear lever [handle] would be if it existed) when they hit the ‘U’ in GUMP.”

Let’s run down the items:

- 1) **G** = gas – what is the state of the gas – amount, tank, pumps, etc. We should know how much we have, but the critical thing here is making sure that it is coming from the correct source (tank) that will safely carry us through the landing – AND a go-around and another approach if needed. If the aircraft has fuel pumps, are they on as (and if) required by the manufacturer?
- 2) **U** = undercarriage – if we are in a fixed gear airplane, the only response is down, however if we want the habit properly developed, down and locked. If we are in a retractable gear aircraft, we can add the appropriate light indication, whether it is three greens or just green. But it MUST be done and verified.
- 3) **M** = mixture – full rich, which of course puts us in position for a go-around if needed. There have been cases where aircraft on go-around were not successful because the mixture was leaned to the point that the power required could not be developed!
- 4) **P** = prop – in a fixed gear aircraft we only need respond with “high”; however, in a constant speed prop aircraft we physically move the prop lever to high as we respond.

The key here is that this is a habit, NOT a rote exercise. As we know from the laws of learning (for CFIs), rote is the lowest level of learning, which only means that the item is memorized and can be parroted back without hesitation. This must be understood and internalized so that it is learned behavior with appropriate thoughts and responses that go with it. Only that level of learning and habit formation will allow this to prevent the gear up landing (LGRM) when all else has failed. I.E., it must be a conscious thing that is done with attention and response on EVERY approach – otherwise it is no different than the gear horn blaring at the pilot when the power is pulled back and they either ignore it or don't know why and don't react.

While the title of this article is related to LGRMs, the benefits are not limited to those alone – though that would certainly be enough. The G, as noted, makes sure that we have a source of fuel (it even works for jets!!) to the engine(s) coming from the correct source(s). The M, while not fully relevant to jets, gives us a second look at the fuel and gets us to full rich with appropriate aircraft – but it also serves as a “G” crosscheck for others. And then there is the P. Jets, of course, don't have those things that rotate around the engines (they think they are “fans”). But for those that do, this item also sets the stage (as does G and M) for attaining full power for go-around.

At this point, let me digress a little bit and tell you about another time when “P” was a lifesaver. While doing a practice engine failure with a student (a Wings participant with a Cherokee Arrow) out in a remote farming area, I called for the abandonment of the approach at the appropriate altitude, the student pushed the throttle forward – but there was no response from the engine. Imagine my surprise!! Don't fool yourself, that is the first reaction – surprise! And, while the nature of the surprise is sinking in, what is happening? You are losing more altitude! And, quite frankly, most of us have never landed off field, AND most off field landings are blown in the last 500'.

So, having been in a throttle cable/attachment failed aircraft before, I quickly moved the throttle back and forth and determined that that was not the problem. At that point, I assumed control of the aircraft, instructed the student to do the fuel checks, etc., and started running through all the scenarios I could think of – while also flying the aircraft for the final approach. I was determined that IF it was going to be necessary to land in that farm field, it would be done well (how's that for thinking a lot of oneself?) and with a minimum of aircraft damage. AND, by habit, since I was on final, I performed a GUMP check. We already knew about the G (which was totally normal) and the U (which we had put down and confirmed when the field was assured – but I sure did it again!). The mixture went to full rich, and then the prop to high – and a funny thing happened when the prop went to high pitch.

There was a slight increase in rpm and suddenly the engine came back to life! It was sure a good feeling to be climbing again – but what had happened? We flew back to the originating field without making any power adjustments, spotting and picking emergency fields as we went, and agreed that no power reductions would be made until the destination runway was “made”. The following day I got a call from the

student following the aircraft check by his mechanic, and what had happened was a failure of the door in the induction system which had, essentially, almost closed, choking off the air to the engine, and the vibration from the increase in rpm had caused it to open back up enough to allow enough induction air for the engine to respond.

So, not only had GUMP (and that wonderful “P”) prevented an off field landing, but undoubtedly a lot of embarrassment afterwards. It is likely that the ground vibration of the off field landing would have also opened the induction door, and when the FAA/NTSB came to investigate, they would have found “no reason for an off field landing”. Wouldn’t that have been a wonderful thing with which to deal – for the next 5 years and while trying to keep one’s certificate valid?

So, in conclusion, GUMP is a good thing, even if a bit “old fashioned”, and should be taught, trained, and learned by instructors and pilots after they complete their training, and it should be part of EVERY approach to EVERY landing, regardless of aircraft type in order for the habit to be properly built and retained. (Jet guys can even benefit when they come back to their other aircraft.) And,

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Thanks for your attention, and I hope that you take this one to heart. Don’t become one of those LGRM statistics; let’s try to reduce/eliminate those LGRMs, and who knows what other benefits may derive.

This article is written by Alan C. Davis – Master Certified Flight Instructor – Emeritus – and is provided to the SAFE Resource Center to be used by other instructors and their students. Alan Davis can be contacted at rakenjake2@ez2.net. 1/15/13