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## Best Glide... Says Who?

By Doug Stewart

I was in a pilot briefing room one dark grey day, getting the weather from the WSI station when I overheard the following conversation between an elderly gentleman and a young man who appeared to be in his 20s. The grey haired fellow was saying: "... but what about 'best loiter' speed? Wouldn't we want to use that speed in a glide, once we had our landing site below us?"

The young man replied: "No! There is only one speed to use once the engine has failed and that is the 'best glide speed' as published in the POH. That glide speed is also known as the 'best Lift over Drag (L/D) speed.' It is that speed alone that will give you the best glide performance because that is where the two curves for parasite drag and induced drag intersect."

I was eager to hear the response to that. Whereas the term "best loiter" speed was a new one to me, I certainly was well familiar with the term "minimum sink speed" that every glider pilot is intimately acquainted with. The greybeard's response was: "Well yes, best L/D speed will give you the greatest distance covered in a glide,

but once we are overhead our chosen landing site, wouldn't we be more concerned with a maximum time aloft to allow us to set up for our pattern and landing?"

The young man was adamant. "No! There is only one glide speed to use, and that is, as I said, the best L/D speed as published in the POH." As I looked at these two folks and took in their animated discussion I noticed that the younger man was wearing a shirt identifying him as an instructor with the local flight school. I must admit that I was taken aback. I had surely thought that the elderly gentleman was the instructor who was trying to lead his client, through a Socratic method, to a better understanding of the subtleties of what to do when the engine quits and the airplane suddenly turns into a glider.

Unfortunately there are many pilots, instructors included, who do not have a thorough understanding of what airspeeds to use in a glide. Certainly "best glide speed" is a very important one to be familiar with. This is indeed the airspeed where the resultant penalties of both induced drag (a byproduct of lift) and parasite drag (simply stated, the drag resulting from things in the way of the airflow around the aircraft) are equal.

This airspeed is typically found in the POH. But for those of us flying older aircraft that don't have a POH (and might not even have much of an operator's handbook either, for that matter) a published source of

this airspeed might not exist. If that is the case, then using the “best rate of climb” speed ( $V_y$ ) for your aircraft as your best glide speed will certainly have you very close to your best L/D speed.

We would most definitely use this airspeed if the engine has ceased to function while we are at altitude, and have some distance to cover as we glide to a suitable landing site. It is the glide speed that will allow us to maximize the distance covered in a glide. Let us also remember that even if we have that speed published in a POH or owners manual, that speed, as published, is determined for use when at maximum gross weight.

Seeing as how too many of the engine failures that pilots experience come as a result of poor fuel management, it is certainly reasonable to think that the aircraft will weigh less than the certified max gross weight when the engine stops working. Keeping this in mind, remember to reduce that glide speed somewhat, to compensate for the lessened weight.

But let us now say that by utilizing the best L/D speed to maximize our glide, relative to distance, we now find ourselves overhead a chosen landing site with plenty of altitude left to lose. Do we still want to maintain that same speed? This is the question the elderly gentleman at the start of this article had been posing. If distance to cover is no longer an issue, wouldn't our ability to maximize our time in the air, relative to altitude, be of

greatest concern?

Glider pilots are very conversant with this speed as they seek to maximize their time in a thermal, and they refer to it as “minimum sink speed.” Unfortunately it is a speed that we power pilots will probably never see in our POHs. (At least I have yet to see it there.) A good way to approximate that speed is to multiply the “clean” stall speed ( $V_{s1}$ ) by 1.2. This should afford most pilots their best “minimum sink speed” maximizing their time aloft.

Let’s also consider some of the other things that we can do to maximize (or

for that matter minimize, if we find ourselves too high) our glide. Certainly our configuration will have a major effect on glide performance. Flaps (oops, I guess that leaves my Super Cruiser out) as well as gear (if you have a retractable gear airplane) can be used to control our descent rate. Certainly “getting dirty” will allow us to descend much more rapidly, if we find ourselves high. My Cardinal RG will rival a grand piano in its glide once the flaps are fully deployed and the gear is down.

However, if we find ourselves getting low on our final approach with the engine silent mode, saving the flap deployment to the last possible moment can quite often yield a balloon-up of anywhere from 10 to 30 feet. If we have already deployed our flaps, fully, or partially, and

realize we might be coming up short, then cleaning up the flaps, although initially yielding a sink, will allow us to accelerate and perhaps make the field. This would be similar to the way glider pilots might work their spoilers and speed brakes while on final approach. We can do the same with our flaps.

I have often had pilots ask me about bringing the propeller to a stop to help in maximizing the glide. It is absolutely true that if we can stop the propeller we will get a significant reduction in drag, which will aid in maximizing the glide. But let's remember that in order to get the prop to stop we are going to have to slow down significantly, typically to an airspeed of less than 60 knots. To do this we will obviously need to pitch up, which will gain us some altitude. But it also means that we might be flirting awfully close to our stall speed. And if we inadvertently stall as we endeavor to stop the prop, the altitude we lose as we recover from that stall will far outweigh any advantages we might have gained from stopping the prop. Therefore my advice is to not bother trying to stop the propeller unless you are really, **really** high, and you are positive you can't get the engine restarted.

Speaking of propellers, there are some things to consider, relative to maximizing our glide, if we have a constant speed, or controllable pitch propeller. When everything gets real quiet and we are at altitude, pulling the propeller control all the way aft, moving the

propeller into coarse pitch, will add significantly to the distance we will cover in a glide, as the drag of the spinning propeller disc is reduced in coarse pitch. This advice is often found in the aircraft POH.

But that is as far as the POH goes. I have some further advice to offer. If I

find myself in an ersatz glider at altitude I will indeed pull my prop to coarse pitch, but once I find myself over my chosen landing spot I will put the propeller back into flat pitch (by moving the prop control all the way in). I consider this akin to putting money in the bank. What I mean by this is that if I find myself coming up short on final approach, as a result of the increased drag that the now extended gear has created, I can now pull the prop control all the way out. As the propeller now “shifts” to coarse pitch the airplane will get “sucked” ahead to the runway.

I would like to discuss one more thing, relative to flying the traffic pattern when our airplane has lost power. When flying with the engine running, we certainly try to plan our turn from the base leg to final so that the airplane intercepts the extended runway centerline at the completion of our turn. It is what we have been striving to do from the day we began learning to land. Now obviously if we realize that we won't make it to the runway if we continue to the extended centerline on the base leg and the engine has ceased working, we turn

towards the runway as soon as that realization hits home.

But what about when we find ourselves high, on the base leg? Certainly getting as dirty as we can both with flaps and gear will help. We can also forward slip to lose altitude. But so often I see pilots turn final as they approach the extended runway centerline even when they are way too high. Where is it written we have to do that? (All our prior training and conditioning, that's where.) Instead, if you find yourself high, continue on through the centerline, and turn back when and as necessary to get yourself on the proper glide slope to your intended touch down point.

Remember, we have to use all the possible tools and techniques we have to get ourselves to a chosen landing site once the engine has gone AWOL. Regardless of whether it's a dark and grey day, or we have... blue skies and tailwinds.

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