

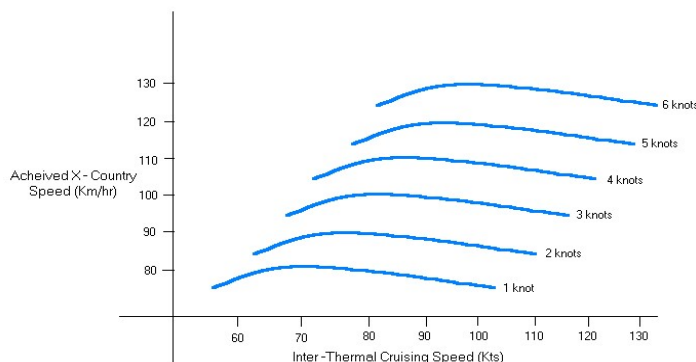


Cruising Speeds and Thermal Strengths.

It is well known that increasing your total average thermal strength for the day will make the biggest single improvement in your cross-country speed. We have already discussed some of the methods used to find these better thermals, but some pilots still find difficulty in being selective enough in their choice of which ones to use and which to reject. Coupled closely to this is deciding upon your cruising speed. The speed you decide to run between climbs on any given day, and indeed for various parts of the one flight, is tied directly to your expectation of the next rate of climb.

Let's begin with thermal selection. What are we looking for in a thermal that we can feel before we actually arrive in the core? Generally a good strong thermal will have a well-developed core, and thus a well-defined area of disturbed air around it. As we fly into this area there will be a distinctive feel to the thermal structure. It will be turbulent and bubbly, with a progressive increase in the rate of climb (and an increasing pressure through the seat of our pants) before we hit the smooth central core. We are NOT looking for sharp gusts, no matter how strongly they register on our variors. How often do you hit a huge gust, only to turn back and find nothing useful? Feel for a well-defined thermal structure. Most often you will see the better pilots barely slow down for these erratic gusts, only feeling their way through them before pushing over and going on.

When we begin our cross-country flying we tend to want to take every thermal available, just to stay airborne, and this habit is often a difficult one to break. Many pilots that are quite experienced still want to stop and climb in thermals that are clearly less than optimum strength for that day. If we calculate the effect that climb rate has on achieved cross-country speeds, then we will soon realise that it is necessary to be far more selective. This graph is for a typical 15 metre ballasted glider. Notice for example that increasing your average thermal strength for the day



from 3 knots to 4 knots will improve your speed from 100 kph to 110 kph. Please remember that these achieved rates of climb are from bottom to top, and will only be two-thirds of the peak reading you see on your averager.

It soon becomes quite obvious that flying through a few of those weaker climbs and pushing on to the better ones will make a large difference. Work hard at raising your confidence in being able to find that next climb, and try to decide before you commit to a turn if the thermal is in fact a good one.

Bruce Taylor

GFA National Coach

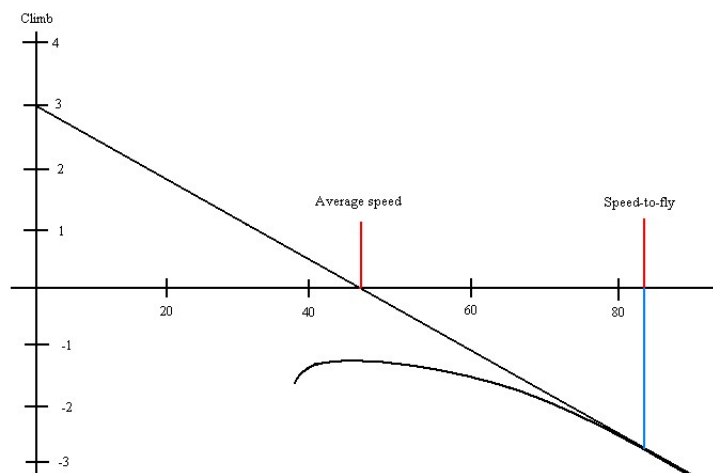
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At this point we need to consider how fast we fly when cruising to the next climb. We want to be able to arrive at a useful height to climb in the next strong thermal, not so low that we are searching for a paddock! From the graph above we can see that cruising at the incorrect speed only costs us a very small amount. 10 knots too fast or too slow will only mean a reduction in cross-country speed of 2 or 3 kph. Notice here that the loss is greater for flying too slowly – flying significantly too fast does however increase your workload in finding better thermals more often. So, armed with the knowledge that our chosen cruising speed is not so vital, we can look carefully out the front and decide where the next good climb may be. If it is far away, right at the limit of our range, we will need to travel more slowly, so that we don't have to stop short and use a weak thermal, which will drag our overall speed down quite a lot. If it is close, we can push along fast and still be at a comfortable height to use it when we arrive.

In Australia, we are generally blessed with consistent, predictable weather. We know that if the last few climbs have been 6 or 7 knots, then it is a fair bet that the next one, and the one after that, will also be that strong. It is not so difficult then to pass up a four knotter on the way, and still be confident of not falling out of our working height band. Given this assumption, we can use the following graph to decide on our cruising



speed for the day. Again, this is for a typical ballasted 15 metre glider. Take the published polar out of your manual, (add just a small grain of salt) and plot such a graph. You may wish to write up a table of cruising speeds for given climb rates, and stick it on your panel. You will of course, remember that these speeds are really...

NOT THAT IMPORTANT! What is more important is to be looking out the front and deciding whether perhaps things don't look as good as they have been looking, and you should not be expecting climb rates to stay the same, or vice versa.

All of these notions are tied together. Our cruising speed is not only tied to the strength of the next climb out there ahead of us, but more importantly to our confidence in our ability to find that climb and use it. That will vary for each and every one of us, depending on our experience and skill level, and on the particular day in question. The top pilot will have a much higher expectation of finding the good ones, and the pilot out on their first Silver C attempt will be less bold... or should be!

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You will also notice that there is no longer any mention of the classic MacCready theory of speed-to-fly. This idea has been replaced by what we might call “Block speeds”, where the aim is to cruise at a more or less steady speed between climbs, with only small variations when in lift or sink. The reasons are many, but efficiency is high on the list – making the wing do the extra work of pulling and pushing is wasteful. Also there is safety – sharp pull-ups are definitely out when there is a chance of anyone else being nearby. In reality it is almost impossible, even for the very best pilots, to anticipate the edge of good and bad air and to react accordingly. Smooth, steady cruising is what we are looking for – keeping up the momentum and establishing a comfortable rhythm throughout the flight.

Work hard at this, and be disciplined about your thermal selection. It is in this area that you will make your biggest gains.

Fly safely, Bruce.