Turbulence – Do You Know YOUR Va?

There are a lot of Va definitions out there, including the textbook one that is delivered by rote when a student is asked what Va (Maneuvering Speed) is. Unfortunately, most of them do not relate to the true understanding of this "life saving" speed. The best definition, albeit also the shortest, is – turbulence penetration speed – the speed you should get to as soon as possible when significant turbulence is encountered. But is it?

To understand, you need to look at a Vg Diagram (most good pilot texts will have one) – that's the diagram that you most likely last saw in your private pilot materials with the stall lines, the limit load and ultimate limit load lines and VNE as the "envelope" of the aircraft – and most of us have never seen an actual one for our aircraft! Va occurs at the point where the positive limit load line intersects the stall line on the positive "g" portion (upper) of the diagram, and we are told that if we are at that speed, the airplane stalls before it exceed the limit and thus gets no damage.

But, there is a problem with that. Look at the bottom portion – the negative g part – of the Vg diagram. There is a similar point there where the negative limit load (which is far less "load" or G's than the positive) intersects the stall line – effectively a "negative Va". In virtually ALL cases, this is a significantly lower speed than the Va on the positive g side, and in addition is much lower in G-force.

So, here's the question. Have you ever had ONLY positive, or "upward", turbulence (i.e. nothing to the negative or downward side)? I know that I surely haven't. What does this mean? Since no negative Va speeds are published – anywhere – when faced with turbulence you MUST slow to a speed **SLOWER than** Va to truly be protected! How much slower? Since nothing is specified here, get as much slower as you can and still have decent aircraft control – and fly out of the turbulence as soon as practical.

(For further illustration, detail, and discussion of this issue, see the companion PowerPoint Presentation – "Vg Diagram and Va – Good Friends of the Pilot" in the SAFE Library by the same author)

Alan C. Davis

MCFI-E/Gold Seal/FAASTeam Rep

rakenjake2@ez2.net

Have a SAFE day!