

NEED WE SAY MORE?



A glider flying over a mountainous landscape. The glider is a high-wing aircraft with a single engine mounted on the fuselage.

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inner wing, but the rolling moment into the turn which results is balanced by the action of the controls. Now if the slower-moving inner wing in a turn is just above the stall and the pilot attempts to raise it with a downward deflection of the aileron, a stall can result because the downward deflection of the control surface increases the effective angle of attack of the inner wing which was almost stalled in the first place. Because it does not happen this way with many *modern* airfoils, this hidden danger is not often discussed but it is inherent in the slow speed turn and should be fully understood.

The severity of the turbulence to be found near the ground depends on several factors, and the most vicious turbulence generally occurs when the air is unstable and the wind is blowing hard. Obstructions like hills, trees and buildings all break up a smooth airflow and can cause dangerous conditions for a pilot. In very turbulent air, gusts in all directions of 10-20 mph are quite common and can throw a glider in any direction, stall it or roll it over into a steeply-banked attitude. Since many gliders have a comparatively poor rate of roll this is a definite danger near the ground, for there may not be time to bring the wings level before the glider strikes the ground.

The area in the lee of a hill is generally to be avoided in windy conditions for severe turbulence can be found there, sometimes extending a mile or so downwind. Also, turbulence will be found in the lee of trees and buildings, possibly to a height of several hundred feet. As a matter of principle, approaches should never be made over obstructions if there is any

alternative clear approach which can be used. Maintaining a reasonably high speed will not necessarily prevent a loss of control in turbulence, for gliders can be rolled over while turning in gusts even against full controls, but it is certainly to be recommended. Also since in straight flight the risks of losing critical altitude are less great, the most important point is to avoid turns near the ground in turbulent conditions.

In a way wind shear results from the same factors that cause turbulence near the ground—obstructions on the ground deflect and slow down the moving air near the earth. Thus it may move in layers of different speeds with the slowest-moving air nearest the earth itself. The result can be that the wind is blowing 30 mph at 100 feet, yet only 10 mph at the ground, with a variation, or gradient, in between. Now a glider on final approach at an indicated airspeed of 50 mph will be moving over the ground at 20 mph at 100 feet altitude but to maintain the same indicated airspeed must move over the ground at 40 mph before touch-down.

Since the properties of inertia and momentum of the glider depend always on motion *with respect to the earth*, not to the airstream through which it is passing, we find that an accelerating force must be applied to move the mass of the glider forward more quickly over the earth as it glides down through the wind gradient. This is of course achieved by moving the stick forward to lower the nose, but the problem is that the drop in airspeed may come so quickly that corrective action cannot be taken in time to prevent a stall. The difficulty here is that many pilots will say they do not need to be concerned with such explanations, and that all they need do is maintain the indicated airspeed above the stall and they will be safe no matter what. This may be true, but a good pilot should want to know what he is up against, particularly when a very real danger may be involved. Also, with the large wing-spans of many of today's sailplanes a turn near the ground in a wind gradient will put the upper wing in faster moving air than the lower wing and can result in an unexpected moment tending suddenly to increase the angle of bank. Obviously the moral is that in strong winds when a gradient may be present over the ground the approach speed should be increased somewhat for safety and no turns should be made near the ground.

The important problem of the hazard in low altitude, abrupt downwind turns will be discussed in more detail in a subsequent issue of the SAFETY CORNER.

Archives Plea

The formation of an SSA Archives is long overdue. The importance of such an Archives cannot be overstressed. We're asking for donations (fully tax deductible — you establish the value) of books, magazines, papers or anything else of historical significance pertaining to soaring.

Please contact the SSA Public Information Committee Chairman, Dale S. May, 608 South Can Dota, Mt. Prospect, Illinois 60057, with your offers. Better still, just pack up your entire attic and ship it to him for which you will promptly get an SSA receipt. Dale has offered to store all items until an Archives building can be established. Don't just sit there. Send something!