Wind Shear

A discussion of the wind velocity gradient on landing

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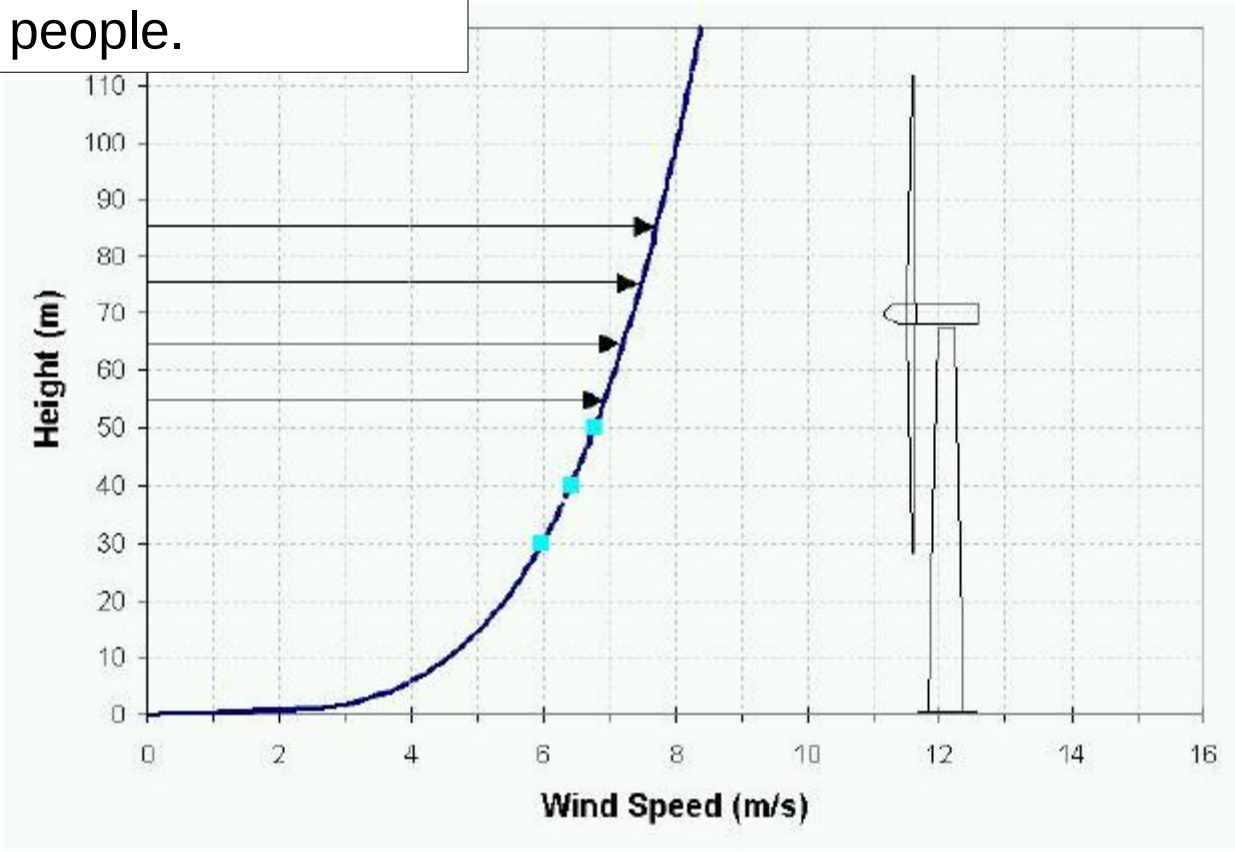
Wind Shear

If you want to quantify the horizontal wind shear gradient then you want to talk to the windmill people.



Wind Shear

The horizontal velocity gradient is a logarithmic function defined by 3 inputs;

- *Surface roughness class*
- *Reference point height*
- *Reference point wind velocity*

The surface roughness classification for Air Sailing Gliderport is 1.0
Our reference point is our wind sock at a height of 15 feet and a reference velocity of 20 Kts.

We are interested in knowing the wind velocity gradient up to 500 feet, our final approach zone.

Wind Shear

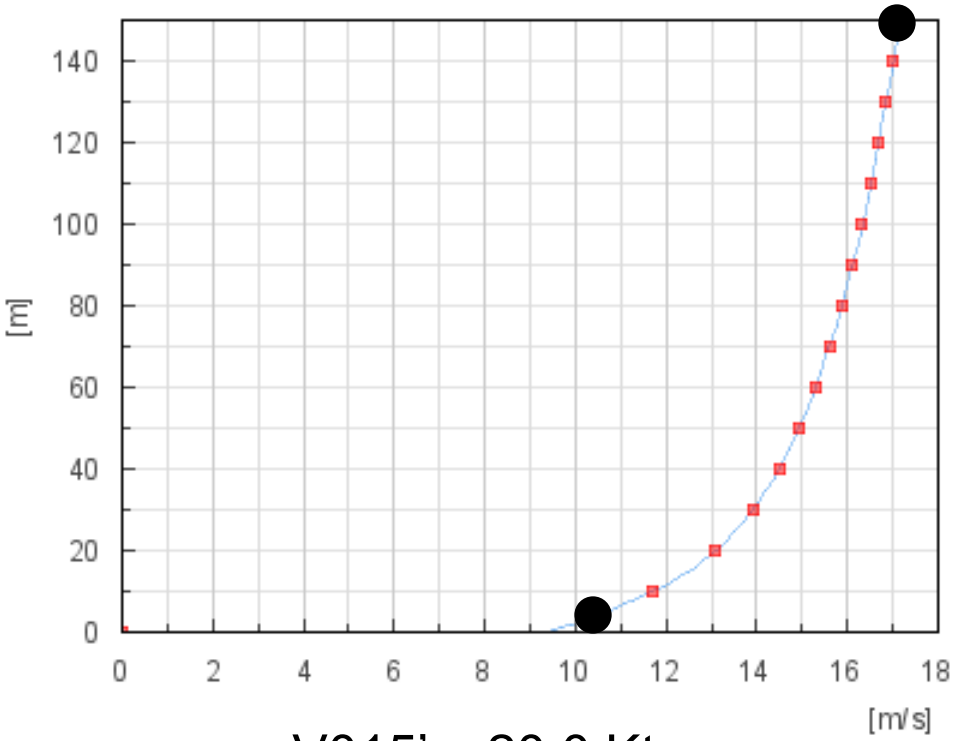
This chart shows the effect of different surface roughness.

Surface Roughness Definitions	Water	Concrete Runway; Sheep Grazed Land	Open agricultral area w/o fences and hedgerows. (Air Sailing)	Sheltering Hedgerows	Trees, Buildings Cities	
Surface Roughness Class	0	0.5	1	2	3	4
Ratio $\frac{V500'}{V015'}$	1.34	1.44	1.67	1.87	2.35	3.98

~ 70% increase in velocity at 500’ based on a 20 Kt wind at the Windsock

Wind Shear

V500’ = 33.3 Kts

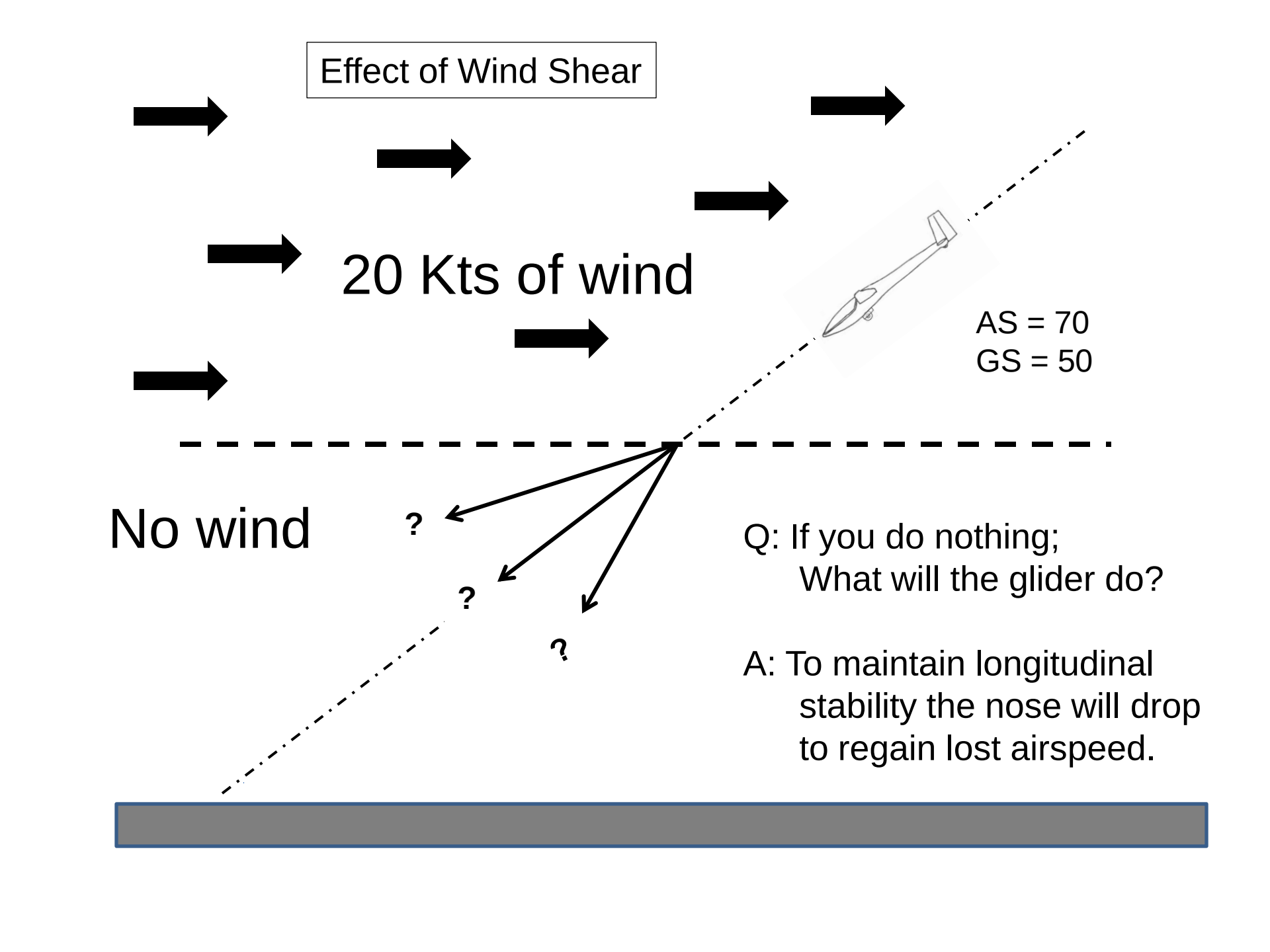


V015’ = 20.0 Kts

This is the actual velocity gradient plot for Air Sailing.

20 Kts at the windsock means 33 Kts at 500 feet.

Effect of Wind Shear



Q: If you do nothing;
What will the glider do?

A: To maintain longitudinal stability the nose will drop to regain lost airspeed.

Wind Shear

Descending thru wind shear means:

Progressively lowering your nose to maintain airspeed.

And

Progressively closing spoilers to maintain glideslope.

The End