Flying Too Fast Decreases Climb Performance

If you fly faster than the recommended speeds, say at the speed where the thrust equals drag, and the power available equals power required, then there is no excess thrust to give you an angle of climb, and no excess power to give you a rate of climb. The aeroplane can only maintain level flight. Higher speeds could only be achieved by descending.

Flying Too Slowly Decreases Climb Performance

Flying slower than the recommended speeds will cause the excess power to be less than optimum (due to the higher drag and reduced power) and so climb rate will be decreased. At low speed the engine–propeller produces more thrust, but the aeroplane has a high drag (mainly induced drag) and there is only a small margin above the stall.

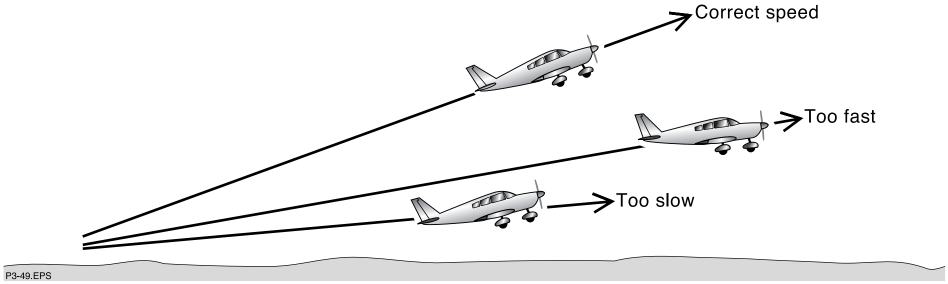

Figure 3-8 **Fly at the correct speed for the best performance.**

Climbing flight is best in the speed range where the engine/propeller can produce maximum excess thrust (or maximum excess power). On the low speed side you may be limited by the stall angle.

High Ambient Temperatures Decrease Climb Performance

If the temperature is high then the air density (ρ) is less, i.e. the density altitude is higher. The engine produces less power and the airframe will be less efficient. The climb performance is reduced on a hot day.

High Power Settings Increase Fuel Consumption

The higher power settings required during the climb result in a higher rate of fuel consumption, and the significance of this on the total fuel burn-off for a given flight will depend on how long the aeroplane is climbing to cruise altitude.

Climb Planning

Changes in Rate of Climb

The rate of climb will decrease as the aeroplane climbs to progressively higher altitudes. When planning the climb, it is usual to consider the following:

- the average wind effect on the climb (wind expected at a level ¾ of the way up to the cruising altitude – this wind may be extracted directly from the forecast, i.e. no interpolation is necessary for exam purposes, as you are permitted to use the forecast wind for the level closest to the ¾ level); and
- the average climb TAS can be determined by applying the temperature (and W/V) at the ¾ level to the climb IAS (e.g. for a climb from sea level to 9,500 ft, the temperature and W/V at 6,000 ft would be applied to the climb IAS).

Note: ¾ cruise level is used as it takes about the same time to climb the last ⅓ as it does for the first ⅔ - so in terms of time, this level is the half-way point.

Once the cruise altitude has been reached, and the aeroplane has accelerated to the desired cruise IAS, the normal procedure is to set cruise power and allow the speed to stabilise. Remember, cruise TAS is invariably higher than the average climb TAS.