Approach & Landing

7.45 On an approach to land, small but virtually continuous changes of power and attitude will be required to maintain the desired flightpath. You will need to be ready to correct any tendency to go above or below the flightpath.

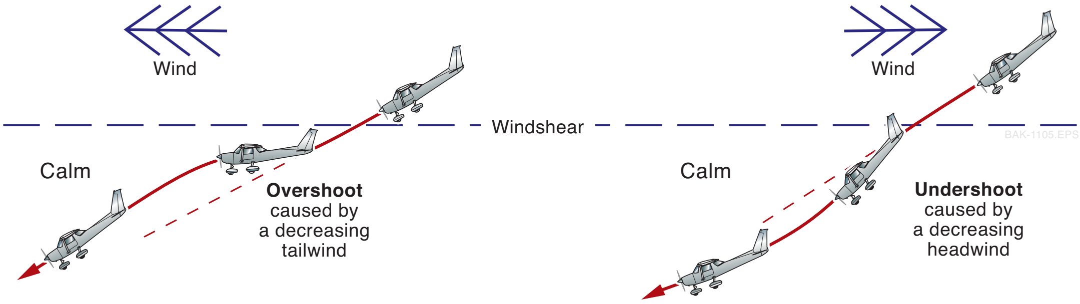

Figure 7-20 Effect of windshear in the descent.

Example 7-1

7.46 An aeroplane on approach to land descends from an overlying tailwind into a calm wind. The effect is similar to stepping from a moving train onto a stationary platform. Your body wishes to maintain its original speed (speed of the train or groundspeed) due to its momentum, and your legs will have to move fast when they first touch the platform. No doubt you will act quickly to adjust to the situation (maybe from a run to a walk). In the same way, an aeroplane entering a new parcel of air will initially maintain its groundspeed (due to its momentum). Since the new parcel of air is stationary, the airspeed will show a sudden increase, and the pilot can see this on the airspeed indicator. (Groundspeed is not displayed in light aircraft.)

7.47 With the sudden increase in airspeed, the nose of the aeroplane will tend to pitch up, and the temporarily improved performance will cause the aeroplane to move above the desired flight-path. You would reduce power and adjust the pitch attitude to regain the desired airspeed (50 kt on the airspeed indicator) and to regain the desired flightpath. Once back on speed and on slope, further adjustments of power and attitude will most likely be necessary – probably a small increase in power and a higher nose attitude to hold the airspeed and not go below slope.

7.48 Since the initial effect of the windshear in the case illustrated is to increase performance, caus-ing an overshoot in the airspeed and/or an overshoot of the flightpath, it is referred to as an *overshoot effect*.

7.49 An overshoot effect due to windshear will occur when an aeroplane flies into:

- a decreasing tailwind;
- an increasing headwind; or
- an updraught (e.g. a thermal).

7.50 An undershoot effect due to windshear will occur when an aeroplane flies into:

- a decreasing headwind;
- an increasing tailwind (for instance, flying near the ground under a thundercloud); or
- a downdraught, such as just under the base of a mature thunderstorm.

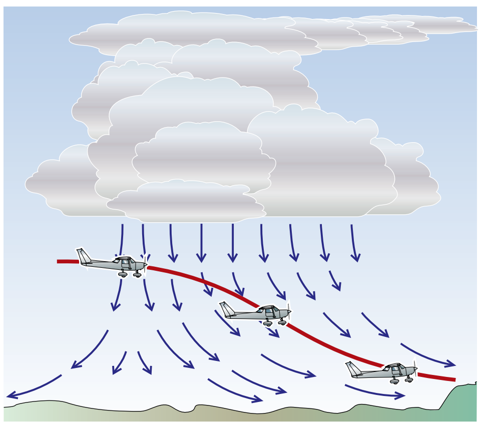

Figure 7-21 Severe downdraughts beneath cumulonimbus (Cb) storm cloud.

Example 7-2

7.51 An aeroplane on approach to land descends from an overlying headwind into calm air. In this case, the aeroplane will lose 10 kt of airspeed as it passes through the windshear, its nose will tend to drop, and it will go below the desired flightpath. This is known as *undershoot effect*. Appropriate corrective action would be to add power and raise the nose to regain airspeed and the desired flightpath, and then, when on speed and on slope, adjust the power and attitude as necessary.

Figure 7-22
The aircraft is vulnerable during the approach.

Turbulence

Mechanical

7.52 Mechanical turbulence is caused by the wind blowing over, around, through and between various obstructions such as mountains, trees, buildings, valleys and tunnels. The wind is forced up and slowed down as it approaches the object and can be severely disrupted causing eddy currents and vortices. The air is lifted over the object and then pours down and around the lee (downwind) side. There can be significant turbulence and downdraughts on the lee side of the hill, and some smaller aircraft cannot climb as fast as the air is descending. The stronger the wind, the greater the turbulence and the greater the danger. It is best to avoid hilly terrain altogether and especially the lee side on a windy day. It's not very pleasant. Particularly stay away from cliffs, sheer faces, ravines and sudden changes in terrain.

7.53 Most of the severe turbulence is in the layers of air closest to the ground and the energy reduces as you get higher. One to two thousand feet of height above the local ground will clear you of the most severe mechanical turbulence – most of the time.

Thermals

7.54 Thermals are rising currents of air caused by the uneven heating of the ground. In summer, they can be quite severe and it is sometimes necessary to cruise at seven or eight thousand feet to avoid the worst turbulence. Also, they are most severe if you fly under a developing, or developed, "lumpy" cumulus cloud. The thermal activity is strongest when the heating of the earth is most active. Early mornings and late afternoons are a better time to fly in summer. When flying in turbulence, try to keep the attitude constant and ignore the pressure instruments – otherwise your control inputs may aggravate the situation. In a strong thermal, you may need to reduce power to maintain your selected altitude. Thermals also affect the final approach path.

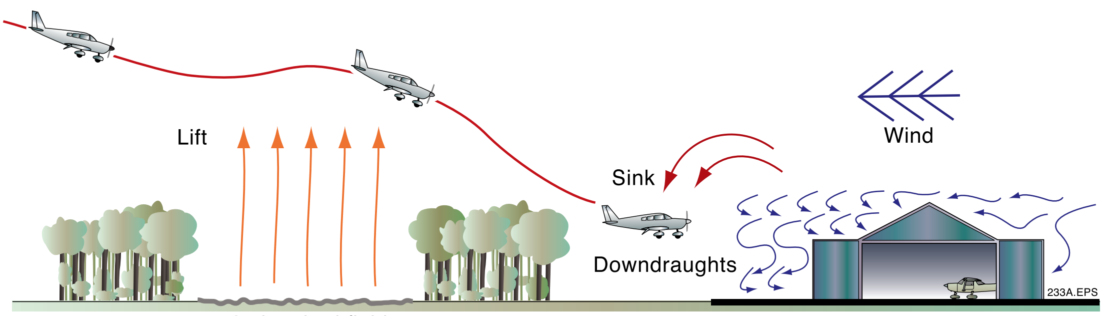

Figure 7-23 Thermals and mechanical turbulence.