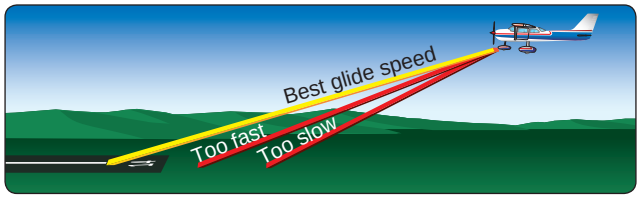

Figure 3-24. *Best glide speed provides the greatest forward distance for a given loss of altitude.*

at slow speeds. With the absent propeller effects and the subsequent compensation for these effects, which is designed into many airplanes, it is likely that, during glides, slight left rudder pressure is required to maintain coordinated flight. In addition, the deflection of the flight controls to effect change is greater due to the relatively slow airflow over the control surfaces.

Minimum sink speed is used to maximize the time that the airplane remains in flight. It results in the airplane losing altitude at the lowest rate. Minimum sink speed occurs at an airspeed less than the best glide speed. It is important that pilots realize that flight at the minimum sink airspeed results in less distance traveled. Minimum sink speed is useful in flight situations where time in flight is more important than distance flown. An example is ditching an airplane at sea. Minimum sink speed is not an often published airspeed but generally is a few knots less than best glide speed.

In an emergency, such as an engine failure, attempting to apply elevator back pressure to stretch a glide back to the runway is likely to lead the airplane landing short and may even lead to loss of control if the airplane stalls. This leads to a cardinal rule of airplane flying that a student pilot must understand and appreciate: The pilot must never attempt to "stretch" a glide by applying back-elevator pressure and reducing the airspeed below the airplane's recommended best glide speed. The purpose of pitch control during the glide is to maintain the maximum L/D, which may require fore or aft flight control pressure to maintain best glide airspeed.

To enter a glide, the pilot should close the throttle and, if equipped, advance the propeller lever forward. With back pressure on the elevator flight control, the pilot should maintain altitude until the airspeed decreases to the recommended best glide speed. In most airplanes, as power is reduced, propeller slipstream decreases over the horizontal stabilizer, which decreases the tail-down force, and the airplane's nose tends to lower immediately. To keep pitch attitude constant after a power change, the pilot must counteract the pitch down with a simultaneous increase in elevator back pressure. If the pitch attitude is allowed to decrease during glide entry, excess airspeed is carried into the glide and retards the attainment of the correct glide angle and airspeed. Speed should be allowed to dissipate before the pitch attitude is decreased. This point is particularly important for fast airplanes as they do not readily lose their airspeed—any slight deviation of the airplane's nose downwards results in an immediate increase in airspeed. Once the airspeed has dissipated to best glide speed, the pitch attitude should be set to maintain that airspeed. This should be done with reference to the natural horizon and with a quick reference to the flight instruments. When the airspeed has stabilized, the airplane should be trimmed to eliminate any flight control pressures held by the pilot. Precision is required in maintaining the best glide airspeed if the benefits are to be realized.

A stabilized, power-off descent at the best glide speed is often referred to as normal glide. The beginning pilot should memorize the airplane's attitude and speed with reference to the natural horizon and noting the sounds made by the air passing over the airplane's structure, forces on the flight controls, and the feel of the airplane. Initially, the beginner pilot may be unable to recognize slight variations in airspeed and angle of bank by vision or by the pressure required on the flight controls. The instructor should point out that an increase in sound levels denotes increasing speed, while a decrease in sound levels indicates decreasing speed. When a sound level change is perceived, a beginning pilot should cross-check the visual and pressure references. The beginning pilot must use all three airspeed references (sound, visual, and pressure) consciously until experience is gained, and then must remain alert to any variation in attitude, feel, or sound.

After a solid comprehension of the normal glide is attained, the beginning pilot should be instructed in the differences between normal and abnormal glides. Abnormal glides are those glides conducted at speeds other than the best glide speed. Glide airspeeds that are too slow or too fast may result in the airplane not being able to make the intended landing spot, flat approaches, hard touchdowns, floating, overruns, and possibly stalls and an accident.

Gliding Turns

The absence of the propeller slipstream, loss of effectiveness of the various flight control surfaces at lower airspeeds, and designed-in aerodynamic corrections complicates the task of flight control coordination in comparison to powered flight for the inexperienced pilot. These principles should be thoroughly explained by the flight instructor so that the beginner pilot may be aware of the necessary differences in coordination.

Three elements in gliding turns that tend to force the nose down and increase glide speed are:

- Decrease in lift due to the direction of the lifting force
- Excessive rudder inputs as a result of reduced flight control pressures