attack (and, hence, airspeed) and the flight path of the landing aircraft and signal corrections to be made in order to achieve the desired flight path and angle of attack. Because of the field of orientation available to the LSO, he is able to perceive the flight path and angle of attack more accurately than the pilot without an angle of attack indicator and mirror landing system.

THE APPROACH AND LANDING

The specific techniques necessary during the phase of approach and landing may vary considerably between various types of airplanes and various operations. However, regardless of the airplane type or operation, there are certain fundamental principles which will define the basic techniques of flying during approach and landing. The specific procedures recommended for each airplane type must be followed exactly to insure a consistent, safe landing technique.

THE APPROACH. The approach must be conducted to provide a stabilized, steady flight path to the intended point of touchdown. The approach speed specified for an airplane must provide sufficient margin above the stall speed or minimum control speed to allow satisfactory control and adequate maneuverability. On the other hand, the approach speed must not be greatly in excess of the touchdown speed or a large reduction in speed would be necessary prior to ground contact. Generally, the approach speed will be from 10 to 30 percent above the stall speed depending on the airplane type and the particular operation.

During the approach, the pilot must attempt to maintain a smooth flight path and prepare for the touchdown. A smooth, steady approach to landing will minimize the transient items of the flight path and provide the pilot better opportunity to perceive and orientate the airplane along the desired flight path. Steep turns must be avoided at the low speeds of the approach because of the increase in drag and stall speed in the turn. Figure 6.4 illustrates the typical change in thrust required caused by a steep turn. A steep turn may cause the airplane to stall or the large increase in induced drag may create an excessive rate of descent. In either case, there may not be sufficient altitude to effect recovery. If the airplane is not properly lined up on the final approach, it is certainly preferable to take a waveoff and go around rather than "press on regardless" and attempt to salvage a decent landing from a poor approach.

The proper coordination of the controls is an absolute necessity during the approach. In this sense, due respect must be given to the primary control of airspeed and rate of descent for the conditions of the steady approach. Thus, the proper angle of attack will produce the desired approach airspeed; too low an angle of attack will incur an excess speed while an excessive angle of attack will produce a deficiency of speed and may cause stall or control problems. Once the proper airspeed and angle of attack are attained the primary control of rate of descent during the steady approach will be the power setting. For example, if it is realized that the airplane is above the desired glide path, a more nose-down attitude without a decrease in power setting will result in a gain in airspeed. On the other hand, if it is realized that the airplane is below the desired glide path, a more nose-up attitude without an increase in power setting will simply allow the airplane to fly more slowly and—in the region of reversed command—eventually produce a greater rate of descent. For the conditions of steady flight, angle of attack is the primary control of airspeed and power setting is the primary control of rate of climb and descent. This is especially true during the steady approach to landing. Of course, the ability of the powerplant to produce rapid changes in thrust will affect the specific technique to be used. If the powerplant is not capable of producing immediate controlled changes in thrust, the operating technique must account for this