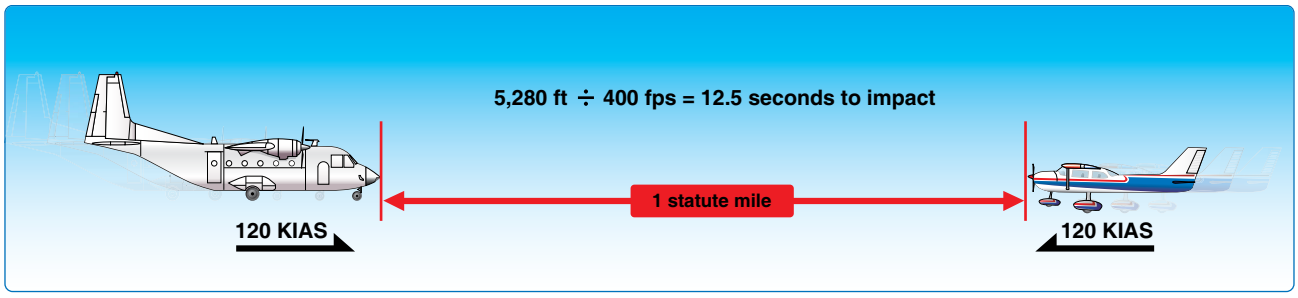

Figure 1-1. *Head-on approach impact time.*

Understanding the Dangers of Converging Aircraft

If a pilot sees an aircraft approaching at an angle and the aircraft's relationship to the pilot does not change, the aircraft will eventually impact. If an aircraft is spotted at 45° off the nose and that relationship remains constant, it will remain constant right up to the time of impact (45°). Therefore, if a pilot sees an aircraft on a converging course and the aircraft remains in the same position, change course, speed, altitude or all of these to avoid a midair collision.

Understanding Rate of Climb

In 2006, a 14 CFR part 135 operator for the United States military flying Casa 212s had an accident that would have been avoided with a basic understanding of rate of climb. The aircraft (flying in Afghanistan) was attempting to climb over the top ridge of a box canyon. The aircraft was climbing at 1,000 feet per minute (fpm) and about 1 mile from the canyon end. Unfortunately, the elevation change was also about 1,000 feet, making a safe ascent impossible. The aircraft hit the canyon wall about ½ way up the wall. How is this determined? The aircraft speed in knots multiplied by 1.68 equals the aircraft speed in feet per second (fps). For instance, in this case if the aircraft were traveling at about 150 knots, the speed per second is about 250 fps (150 x 1.68). If the aircraft is a nautical mile (NM) (6,076.1 feet) from the canyon end, divide the one NM by the aircraft speed. In this case, 6,000 feet divided by 250 is about 24 seconds. [*Figure 1-2*]

Understanding the Glide Distance

In another accident, the instructor of a Piper Apache feathered the left engine while the rated student pilot was executing an approach for landing in VFR conditions. Unfortunately, the student then feathered the right engine. Faced with a small tree line (containing scrub and small trees less than 10 feet in height) to his front, the instructor attempted to turn toward the runway. As most pilots know, executing a turn results in either decreased speed or increased descent rate, or requires more power to prevent the former. Starting from about 400 feet without power is not a viable position, and the sink rate on the aircraft is easily between 15 and 20 fps vertically. Once the instructor initiated the turn toward the runway, the sink rate was increased by the execution of the turn. [*Figure 1-3*] Adding to the complexity of the situation, the instructor attempted to unfeather the engines, which increased the drag, in turn increasing the rate of descent as the propellers started to turn. The aircraft stalled, leading to an uncontrolled impact. Had the instructor continued straight

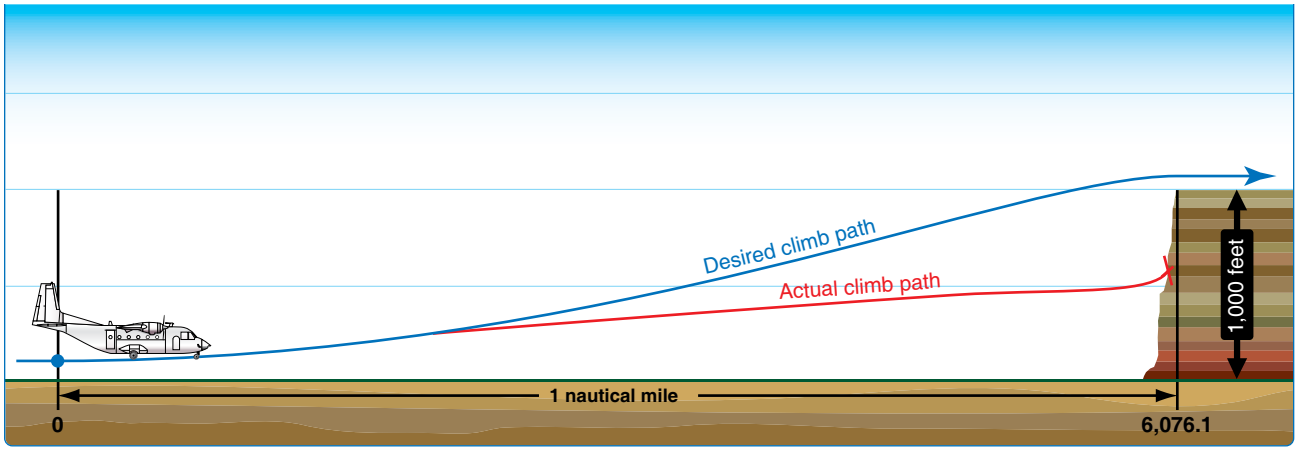

Figure 1-2. *The figure above is a scale drawing of an aircraft climbing at 1,000 fpm, located 1 NM from the end of the canyon and starting from the canyon floor 1,000 feet below the rim. The time to cover 6,000 feet is 24 seconds. With the aircraft climbing at 1,000 fps, in approximately ½ minute, the aircraft will climb only 500 feet and will not clear the rim.*