

include outside visual references. If the glider is gaining or losing airspeed, the pitch attitude should be adjusted in relation to the horizon. During all turns, aileron, rudder, and elevator are used to correct minor variations in pitch and bank just as they are in straight glides.

### Roll-Out

The roll-out from a turn is similar to the roll-in except that coordinated flight controls are applied in the opposite direction. Aileron and rudder are applied in the direction of the roll-out or toward the high wing. As the angle of bank decreases, the elevator pressure should be relaxed, as necessary, to maintain airspeed.

Since the glider continues turning as long as there is any bank, the roll-out must be started before reaching the desired heading. The amount of lead required to roll out on the desired heading depends on the degree of bank used in the turn. Normally, the lead is one half the degrees of bank. For example, if the bank is  $30^\circ$ , lead the roll-out by  $15^\circ$ . As the wings become level, the control pressures should be smoothly relaxed so the controls are neutralized as the glider returns to straight flight. As the roll-out is being completed, attention should be given to outside visual references, as well as the airspeed and heading indicators to determine that the wings are being leveled and the turn stopped.

Common errors during a turn include:

- Failure to clear turn.
- Nose movement before the bank starts—rudder is being applied too soon.
- Commencement of bank before the nose starts turning, or nose movement in the opposite direction—the rudder is being applied too late.
- Up or down nose movement when entering a bank—excessive or insufficient elevator is being applied.
- Rough or uncoordinated use of controls during the roll-in and roll-out.
- Failure to establish and maintain the desired angle of bank.
- Overshooting/undershooting the desired heading.

In a slipping turn, the glider is not turning at the rate appropriate to the bank being used, since the glider is yawed toward the outside of the turning flightpath. The glider is banked too much for the rate of turn, so the horizontal lift component is greater than the centrifugal force. Equilibrium between the horizontal lift component and centrifugal force is reestablished either by decreasing the bank (ailerons), increasing yaw (rudder), or a combination of the two. [Figure 7-30]

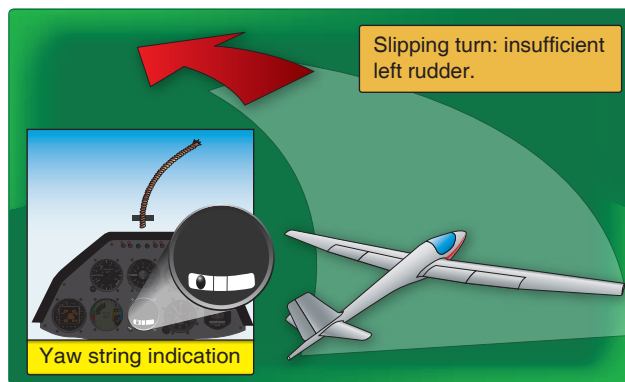


Figure 7-30. Slipping turn.

A skidding turn results from an excess of centrifugal force over the horizontal lift component, pulling the glider toward the outside of the turn. The rate of turn is too great for the angle of bank. Correction of a skidding turn thus involves a decrease in yaw (rudder), an increase in bank (aileron), or a combination of the two changes. [Figure 7-31]

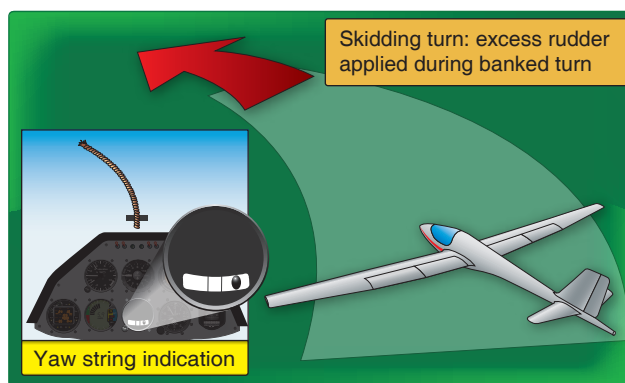


Figure 7-31. Skidding turn.

The yaw string identifies slips and skids. In flight, the rule to remember is simple: step on the head of the yaw string. If the head of the yaw string is to the right of the tail, then the pilot needs to apply right pedal. If the head of the yaw string is to the left of the tail, then the pilot should apply left pedal. [Figure 7-32]

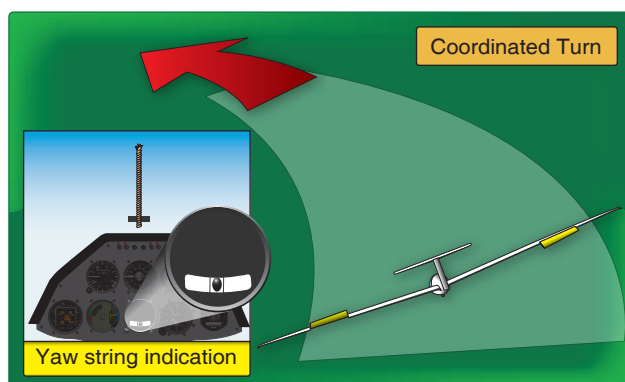


Figure 7-32. Coordinated turn.