The Yaw String

This article describes a 'yaw string,' a simple device for indicating a slip or skid in a turn. It gives the pilot the same information as the slip/skid ball found in GA aircraft.

The following explains how to interpret the yaw string indication, how to make one, and why it is preferred over a slip/skid ball.

1. The String

On most Challengers and similar aircraft, you will find a short piece of string or yarn taped to the bottom center of the windshield. This is referred to as a 'yaw string' and is used to indicate a slipping or skidding condition.

Yaw strings are very common on gliders and you will often see them on the windshields of fighter jets. However, you will not see them on most GA aircraft because they only work on aircraft with no propwash over the windshield.

2. The Slip and Skid

Almost anyone who has taken flight training knows what a slip or skid is, but for those who have no flight training or experience, I'll try to illustrate it with the analogy of driving down a muddy road.

If you drive down a slick road (mud or ice will do) and you come to a sharp curve that is steeply banked, you could either slip or skid. If you drive too slowly around the curve, you will slip to the inside of the curve. But if you drive too fast you will skid to the outside.

If you drive at just the right speed, neither too fast nor too slow, you will just go around the curve with no slip or skid. However, a slip or skid in an aircraft is not dependent on the speed of the aircraft because the pilot can adjust the angle of bank to match the speed. You can't do this with the road.

Driving around this curve, you are on the ground and have that as a reference to see what is happening. But in the air there are no reference points. You need an instrument to indicate when a slip or skid is occurring.

To understand why you need to know if you are slipping or skidding, you need to fully appreciate how an aircraft turns.

3. How an Aircraft Turns; Adverse Yaw

On boats, you have a rudder and that is what you use to make a turn. (I know outboards don't have rudders, but the thrust of the prop serves the same function)

On aircraft you also have a rudder, but you do not turn an aircraft by the use of the rudder alone. Aircraft wings create lift, which is what holds the aircraft in the air.

To turn, you bank the wings in the direction you wish to turn. This tilts the lift off vertical, and this tilt converts part of the lift into a sideways force, which is what turns the aircraft in a new direction.

Banking the wings is accomplished by lowering the aileron on the outboard wing and raising the aileron on the inboard wing. Raising the aileron on the inboard wing decreases the drag on that wing while lowering the aileron on the outboard wing increases the drag on that wing.

This difference in drag on the wings tends to pull the nose of the aircraft to the side. This movement of the nose about this axis is called 'yaw,' and since the yaw is to the side opposite that to which you wish to turn, it is called 'adverse yaw.'

4. Yaw String Indication

The function of the yaw string is to indicate the presence or absence of yaw. The purpose of the rudder is to counter the adverse yaw and put the aircraft into what is referred to as a 'coordinated' condition. This means that all the controls are deployed in the proper sequence and amounts to cause the aircraft to turn in a proper manner.

The Slip/Skid Ball found in most GA aircraft indicates the same condition as the yaw string. However, the slip/skid ball is a gravity instrument mounted on the instrument panel whereas a yaw string responds to the airstream over the aircraft.

Since the yaw string reads the airstream directly, it is faster acting and more sensitive, and it has the added benefit of being directly in your field of view. You are not required to look back inside the aircraft to coordinate your turn.

5. Interpreting the Indicators

If you slip in a left turn . . .

Slip/Skid Ball: The ball will move to the left of center.
Yaw String: The top of the string will move to the right.

Both are indicating the same condition but in an opposite manner.

The corrective action called for is more Left rudder.

Observe: Ball to left means left rudder. Step on the ball.

String to right causes the bottom of the string to point to your left foot. The string is a pointer, pointing to the rudder pedal that needs more pressure.
It is this difference that makes it difficult for some pilots accustomed to using a slip/skid ball to use the yaw string. But with practice, the yaw string is by far the better instrument, and it weighs nothing.

6. Making a Yaw String

Yaw strings are usually made from such things as knitting yarn and are taped to the bottom center of the windshield using a clear tape. (Don't use Duct Tape--It looks terrible and is very hard to clean off.)

The strings are usually 3 to 4 inches long but some are as much as 6 inches.

Checking the string should be a part of any preflight inspection as dew or frozen precipitation will stick them to the windshield and render them inoperative.

Install a yaw string and practice with it. You will find it to be one of your most valuable flight instruments and the cheapest you will ever buy.

I call mine, 'My Low Tech Heads Up Display'.

Author: George Hurt