Highlights and Margin Notes in Wolfgang Langewieshe’s

*Stick and Rudder: An Explanation of the Art of Flying*

Chapter 11 Notes

Perhaps my notes and observations will inspire you to buy your own copy and learn from this classic…or to take the copy you already own off the shelf and revisit its great lessons, just as I am doing again now.

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Continuing my notes on Wolfgang Langewiesche’s essential classic, *Stick and Rudder*.

Part III: The Controls

Chapter 11: “The Rudder”

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<th>Page No.</th>
<th>Highlighted Text (Langewiesche’s words)</th>
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<td>176</td>
<td>Rudder pedals are unnecessary…they serve no very good purpose but can cause much trouble. The airplane…should have no rudder pedals. In all probability it will have no rudder pedals 10 years hence.</td>
<td>Or, perhaps not.</td>
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<td>As long as our airplanes have this control [the rudder], it is most important to the pilot. Fully a third of an elementary course in flying is devoted…to teaching the use of the rudder.</td>
<td>Well, it should be anyway.</td>
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<td></td>
<td>The uses of the rudder…to steer the airplane while taxing….</td>
<td></td>
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<td>177</td>
<td>The rudder is vital during the takeoff run….</td>
<td>Turning tendencies</td>
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<td></td>
<td>In flight, most airplanes need rudder against the “torque”…</td>
<td>Except even with flaps you often need sideslip in a crosswind. L. apparently thought all airplanes will have automatic rudder and landing in a crab, Ercoupe-like.</td>
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<td>…to produce sideslip. Sideslip is useful in maneuvering an airplane to a landing on a predetermined spot…. It permits the pilot to get rid of altitude without picking up speed. But the maneuver is unnecessary in an airplane equipped with a flap, a spoiler, or some other device by which the descent can be steepened without building up excess speed.</td>
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<td>178</td>
<td>…in crosswind landings….an airplane equipped with tricycle landing gear…can afford to touch with some sideways drift. Hence, this use of the rudder could be dispensed with, too.</td>
<td>Except: side load limitations</td>
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<td>The rudder is very important in a stall…. As long as [the airplane] is stalled it is true that only the rudder will keep its wings level or keep it from turning. Once the airplane is in a spin, it is true that the rudder is an important help in getting it out.</td>
<td>Seems to be refuting his earlier argument that rudder can be eliminated.</td>
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<td></td>
<td>Airplanes can be made unstallable, and they can very successfully be made unspinnable by restricting the elevator travel and suitably designing the ailerons. And once the stall and spin danger is gone, this use of rudder is no longer essential.</td>
<td>OK, that’s it. So, why did this never happen?</td>
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<td>182</td>
<td>When you use rudder in the beginning of a turn, you use it not to turn the airplane, not to “help get the turn started”; you use it only to keep the airplane from turning—the wrong way! You use rudder because you are using the ailerons.</td>
<td>Rudder = adverse yaw control</td>
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<td>183</td>
<td>The moment [the pilot] has established the bank, he no longer needs any aileron, and thus he lets the stick</td>
<td>Rudder while rolling into and out of the turn, but not during the turn once established.</td>
</tr>
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come back to neutral. And the moment he does that he
rids the airplane of all adverse yaw effects.... Freed of
the adverse yaw effect, it suddenly starts to turn
willingly.... Now that no adverse yaw effect acts on
the airplane, the rudder is no longer needed. Thus, when he
neutralizes his ailerons, the pilot must also neutralize
his rudder.

184-185 Every time a gust drops one wing or the other, we level
the airplane again by aileron. And, whenever ailerons
are used, however slightly, they cause an adverse yaw
effect.... Even the slightest hand pressure on the
aileron must be accompanied by foot pressure on the
pedals.

185 The Wrights... hitched their rudder up mechanically with
their aileron control. Aileron...would automatically
always be accompanied by rudder....

186 The only real purpose of the rudder is to counteract the
adverse yaw effect of the ailerons. Ailerons can be
designed that cause practically no adverse yawing
effect; hence we ought to be able to do not only without
the rudder pedals but actually without the rudder itself.

187 Prof. Koppen of MIT has built rudderless safety
airplanes which “coordinate” extremely well; and he
goes so far as to say this about the rudder: “The only
purpose of the rudder is to cover up the mistakes of the
designer.”

I’ll add chapter highlights and notes until we reach the end of the book. If you’re impatient—and I
hope you are—you won’t wait for my musings, but instead will secure your own copy of Stick and
Rudder now. Beyond simply reading its words, you’ll truly analyze, criticize, mark up and
understand Langewiesche’s teachings to, as Adler suggests, make this book your own.

I look forward to your comments on these notes and the larger work. Please send your thoughts
to me at mastery.flight.training@cox.net. Thank you.

Pursue Mastery of Flight.
Thomas P. Turner, M.S. Aviation Safety
Flight Instructor Hall of Fame
2010 National FAA Safety Team Representative of the Year
2008 FAA Central Region CFI of the Year

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