



Highlights and Margin Notes in  
Wolfgang Langewieshe's

***Stick and Rudder: An Explanation of the Art of Flying***  
**Chapter 18 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 VI: The Dangers of the Air**

**Chapter 18: "The Dangers of the Air" by Leighton Collins**

Page No.	Highlighted Text (Langewiesche's words)	My margin notes
322	The dangers of the air are not what most pilots think they are. We are often cocky at the wrong time. And often we are afraid at the wrong time!	Remember this chapter, its data and its conclusions, are the result of the authors' early 1940s reflection on his experience from the 1930s.
323	As far as the air-line pilot and passenger are concerned, flying is a particularly safe form of transportation. As far as the student pilot, both civil and military, is concerned, learning to fly is also a safe venture. Beyond these two categories, however, there are many pitfalls.	Not much has changed since the 1930s.
	...an inquiring person is usually presented with the per cent improvement in accident frequency during recent years. Or stress will be put on the fact that only one out of every several hundred accidents involves fatalities....	That's how we do it now.
	...the figures of recent years comes mainly from inclusion of a large volume of especially favorable figures from the training category.	Except now we have two-pilot turbine General Aviation operations raising the reported safety level.  Once pilots exit the structured training environment they're on their own...and the record shows it.
323-324	The main obstacle in the way of the safer airplane is not aerodynamics but a quirk of human nature. A part of the zest of flying is its potential danger. A great part of a pilot's pride in his skill is that he is able to fly safely mainly because of this skill. He doesn't want [flying to be] made safe for him; he wants to make it safe for himself.	Ego and the pilot's hero complex.  (2020 note): We attract new pilots with air shows and aerobatics and tales of bravado, but then have to impress upon the pilot not to do the things that made him/her want to fly in the first place.
324	A considerable part of flying accidents are not related to lack of piloting technique but to a plain lack of judgment.	
	Have the training advocates proved anything more than it is possible, under their particular system of regimentation, to teach people to fly safely while they are learning?	Then we cut them loose.
	The question of why people fly no more safely than they do when they are on their own, free of prescribed flight exercises, free of the watchful eye of their flight instructor, is yet to be answered.	(2020): Guess what? It's still not answered.
	An average pilot...worries mostly about an engine failure, feels that if the engine will just keep going he will too.... Fatal accidents following a motor failure... [are almost always] spun in.	Engine failures don't kill pilots. Poorly planned and executed glides after engine failures kills pilots.

325	An airplane can spin only with the pilot's help.	(2020): A single-engine airplane will naturally pitch downward to the trimmed speed. It will stall only if the pilot, the autopilot, or a runaway trim resists this natural tendency and <i>makes</i> it stall.
	Pilots who sustain a motor failure should instantly regard their then major risk as spinning the airplane...almost always out of turns...either to get back to the take-off field or to get into ...a random field....	(2020): The impossible/improbable/impractical turn
	Airplanes do all right by their occupants if only they are got on the ground under control.	Wings level, under control, at the slowest safe speed
	Motor failure [accounts for] 6 percent [of fatal accidents]	Not much change now
325-326	Weather...8 percent of all fatalities...the pilot having pushed on and on under lower and lower ceilings and into less and less visibility...fundamentally a judgment hazard....	Again, not much change
327	The average pilot regards structural failure as his third flying risk...[but] also in an 8 percent bracket...almost always associated with acrobatic flying...[the] impulse to show off....	
328	And thus we leave the average pilot—who regards engine failure, weather, and structural failure as constituting nearly all of his flying hazards—and is dead wrong.	
	...you will find always the same thing—the pilot lost control of the aircraft.	(2020): LOC-I, the #1 scenario according to NTSB
	Exhibitionism [is] a major hazard in flying.	
329	Once on his own [after training], there surges in a pilot a powerful impulse to break the bonds of every restraint that has followed him into the free air. He wants...to play...[an] expression in speed and infinite freedom....	(2020): Incremental risk tolerance and the Normalization of Risk
	In nearly 70 percent of fatal accidents the airplane spun out of a turn, hit the ground with the motor running normally.	I wonder how this compares to today?
	[The pilot] thinks of stalls mainly in terms of the way he practiced them in training....	(2020): The Truth About Stalls: Actual stall scenarios are very different from how we train and evaluate stalls.
330	The are simply almost not fatalities following motor failures other than from the pilot's spinning the airplane; the usual story is that he was trying to make an abrupt turn to head into some selected landing area.	"The impossible turn"
	Ask a pilot how most people get killed in airplanes and he will tell you anything except the fact that most of them lose control of their airplanes in turning flight close to the ground.	
	Could we go a year in which no one lost control of his airplane in a turn...our flying record would be as good as our training record.	
331	By and large we are no more than day-olds in the air.	Even the highly experienced of us has little actual time in flight.
334	Angle of Attack is controlled solely by the elevators.	Power too, if you have enough of it...mainly in a jet
336	The pilot relates safety not to Angle of Attack but to the attitude of the plane.... Few pilots realize how easy it is and what a tricky thing it is to spin an airplane with ailerons alone in an incipient stall in a turn.	Adverse yaw, drag and angle of attack from ailerons
338	In practice stalls and spins the ground only says "boo"; in the real thing it comes after you.	Ground proximity and "ground rush"
340	A momentary increase in the Angle of Attack at which the wing is flying...an upward bump.... A downward bump...[is] a negative Angle of Attack.... In rough air Angle of Attack, and hence lift, is a fluctuating quantity, something we can control only moderately.	
345	In 25 years [since the First World War] there has not been added to our prescribed curriculum a single maneuver directed at the real killer in flying—loss of control in turning flight close to the ground.	(2020) And now, for more than 100 years. How can we address this, safely?
347	Another weak point in our teaching today is in what little	...and still today.

	we do teach about control misapplication in turns.	
348	We should add some new maneuvers to the curriculum. Possibly they should be called <i>safety exercises</i> ...designed to show whether the student had acquired certain fundamental conceptions and reactions.	
348-349	First, there should be at least one exercise to teach the danger of excessive maneuvering in slow flight.... Attention throughout the maneuver would be concentrated on the student's quickness in loosening his turn at the first evidence of questionable controllability.	A stall equivalent of the Vmc maneuver in multiengine airplanes.
349	The second [exercise]...some way to know that a student will(1) react instantly to unsatisfactory aileron response by reducing Angle of Attack, and (2) that he will not be afraid to nose down when close to the ground.	More Vmc, with the ground rush component somehow introduced.
350	In real life (as against mere practice) you don't expect a stall	(2020): In training pilots are pessimists, expecting and looking for trouble; in operations pilots are optimists, expecting things to go as planned.
	There is no single training maneuver today which bears effectively on the one trouble which kills pilots.	Nor is there yet today.

Secure your own copy of *Stick and Rudder* and make your own notes and observations. Beyond simply reading its words, 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](mailto:mastery.flight.training@cox.net). Thank you.



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