NATIONAL ASSOCIATION OF FLIGHT INSTRUCTORS

MENTOR LIVE

Captain Brian Schiff

- Veteran captain for a major U.S. airline
- More than 20,000 hours
- Active flight instructor since 1985
- Wide-ranging general aviation experience
- Selected by AOPA to conduct seminars nationwide

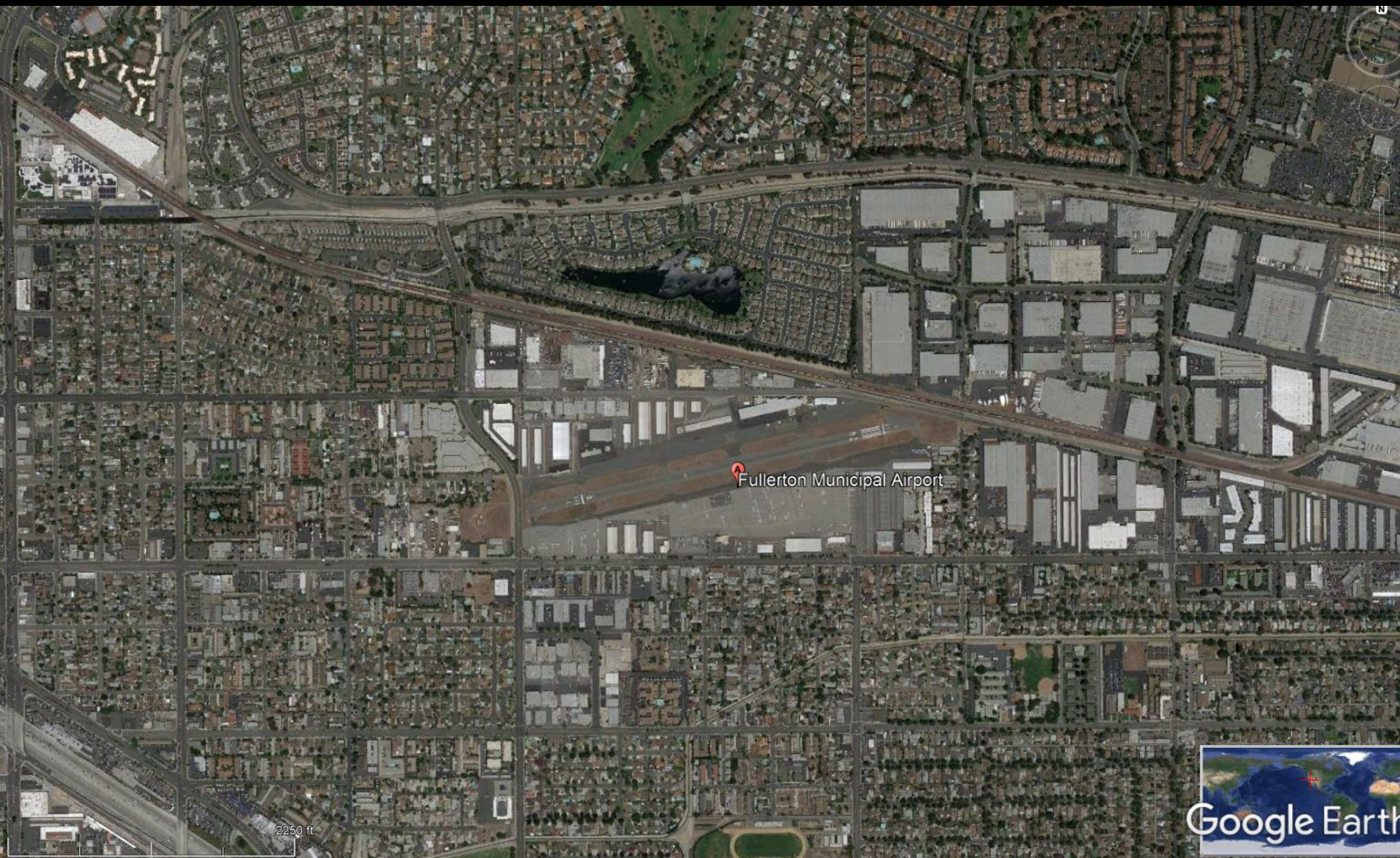
The Possible Turn

Captain Brian Schiff

ENGINE FAILURE AFTER TAKEOFF

The Rule—Land Straight Ahead

SAFER: RETURN TO AIRPORT?



ONLY THE ACCIDENTS ARE TRACKED

- Often stall/spin
- We don’t hear about the successful turnbacks

RETURN TO THE WOMB

FAA:

"Decisions are made impulsively with inadequate planning."

FAA TO FLIGHT INSTRUCTORS

9/13/18 AC 61-83J
Appendix A

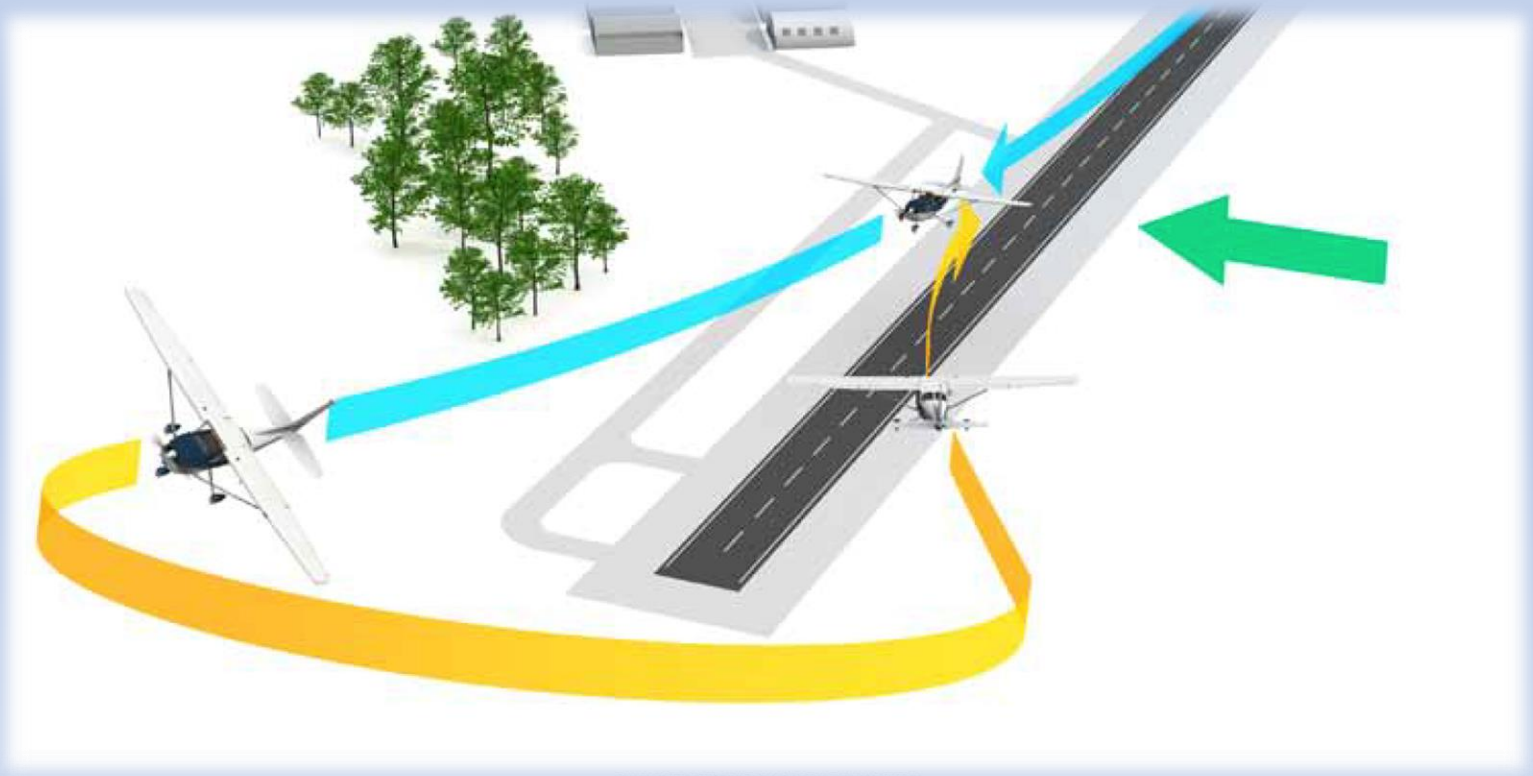
A.11.4 Return to Field/Engine Failure on Takeoff. Flight instructors should demonstrate and teach trainees when and how to make a safe 180-degree turnback to the field after an engine failure. Instructors should also train pilots of single-engine airplanes not to make an emergency 180-degree turnback to the field after a failure unless altitude, best glide requirements, and pilot skill allow for a safe return. This emergency procedure training should occur at a safe altitude and should only be taught as a simulated engine-out exercise. A critical part of conducting this training is for the flight instructor to be fully aware of the need for diligence, the need to perform this maneuver properly, and the need to avoid any potential for an accelerated stall in the turn. The flight instructor should demonstrate the proper use of pitch and bank control to reduce load factor and lower the stall speed during the turn. After completing this demonstration, the flight instructor should allow the trainee to practice this procedure under the flight instructor's supervision. Flight instructors should also teach the typical altitude loss for the given

Prog ctors informed of
the cl nce aviation
safety ctor cadre.
Atten may renew his or
her fl

make a safe, coordinated turn with a sufficient bank. These elements should give the pilot the ability to determine quickly whether a turnback will have a successful outcome.

The s akeholders
suppo

sufficient safety factor, should be briefed and related to the altitude at which this maneuver can be conducted safely. In addition, the effect of existing winds on the preferred direction and the viability of a turnback should be considered as part of the briefing.



CONSIDERATIONS

PILOT ERROR

FUEL MANAGEMENT

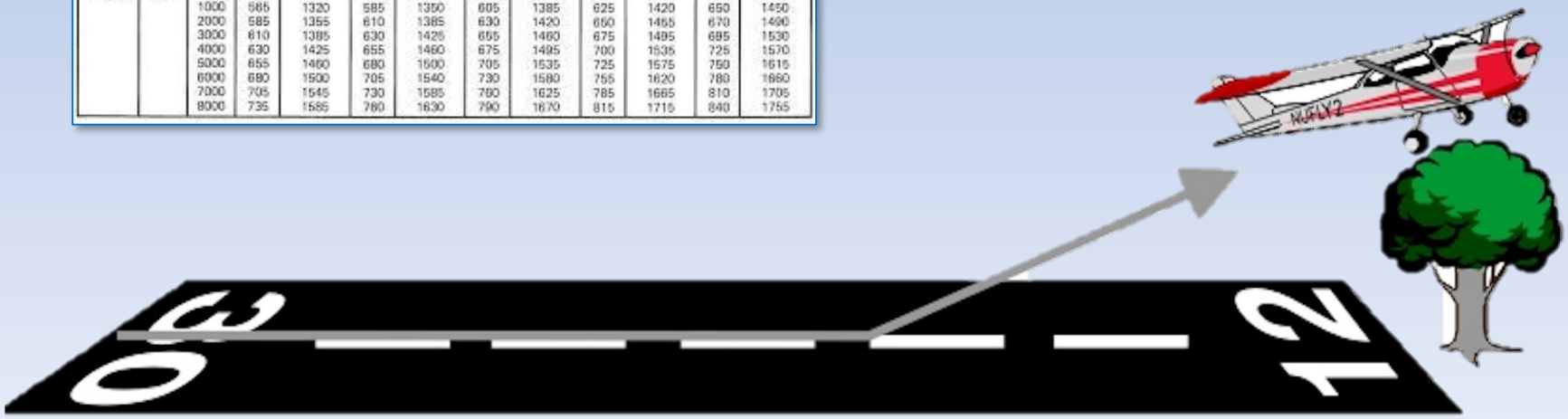
IN A HURRY

NO CHECKLIST

Causal Factors

Takeoff Planning

WEIGHT LBS	SPEED AT 50 FT KIAS	PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
			GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS
2550	62	S.L.	545	1200	565	1320	585	1350	605	1380	625	1415
		1000	565	1320	585	1350	605	1385	625	1420	650	1450
		2000	585	1355	610	1385	630	1420	650	1465	670	1490
		3000	610	1385	630	1425	655	1460	675	1495	695	1530
		4000	630	1425	655	1460	675	1495	700	1535	725	1570
		5000	655	1460	680	1500	705	1535	725	1575	750	1615
		6000	680	1500	705	1540	730	1580	755	1620	780	1660
		7000	705	1545	730	1585	760	1625	785	1665	810	1705
		8000	735	1585	760	1630	790	1670	815	1715	840	1755



Wind Effect on Turn Radius

Turn around into wind

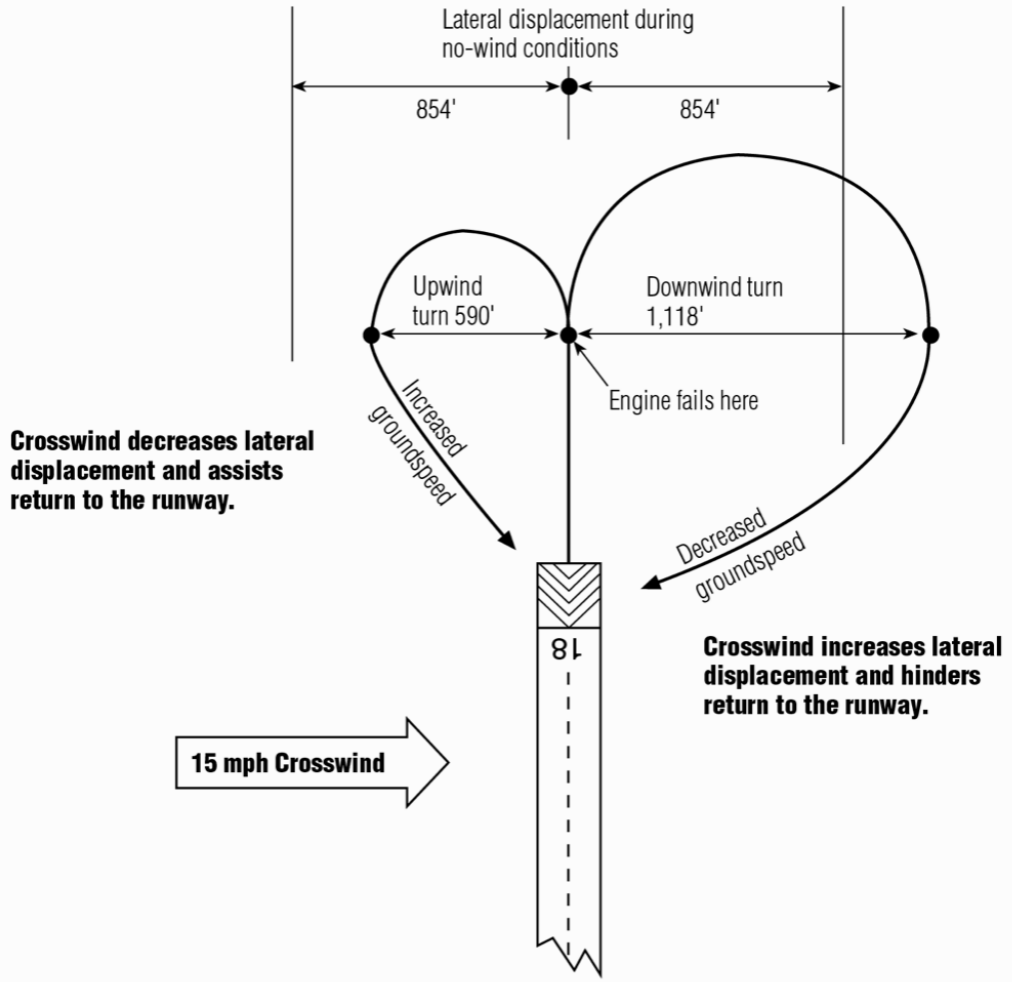
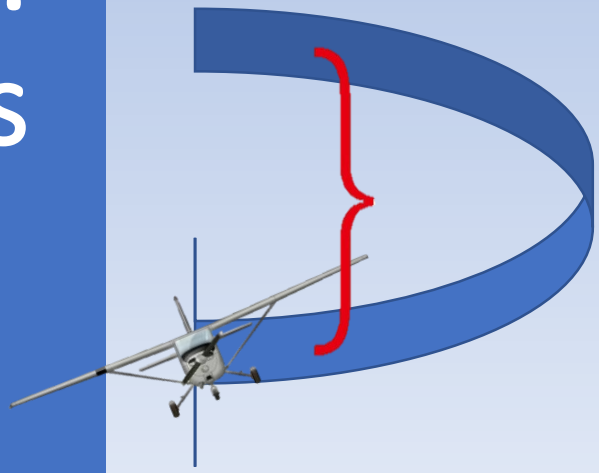


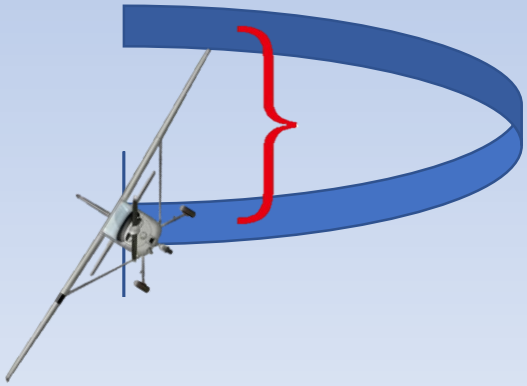
Figure 81. Effect of a 15-mph crosswind on lateral displacement when gliding in a 45°-banked turn at 80 mph.

Bank Angle vs. Altitude Loss

SHALLOW BANK



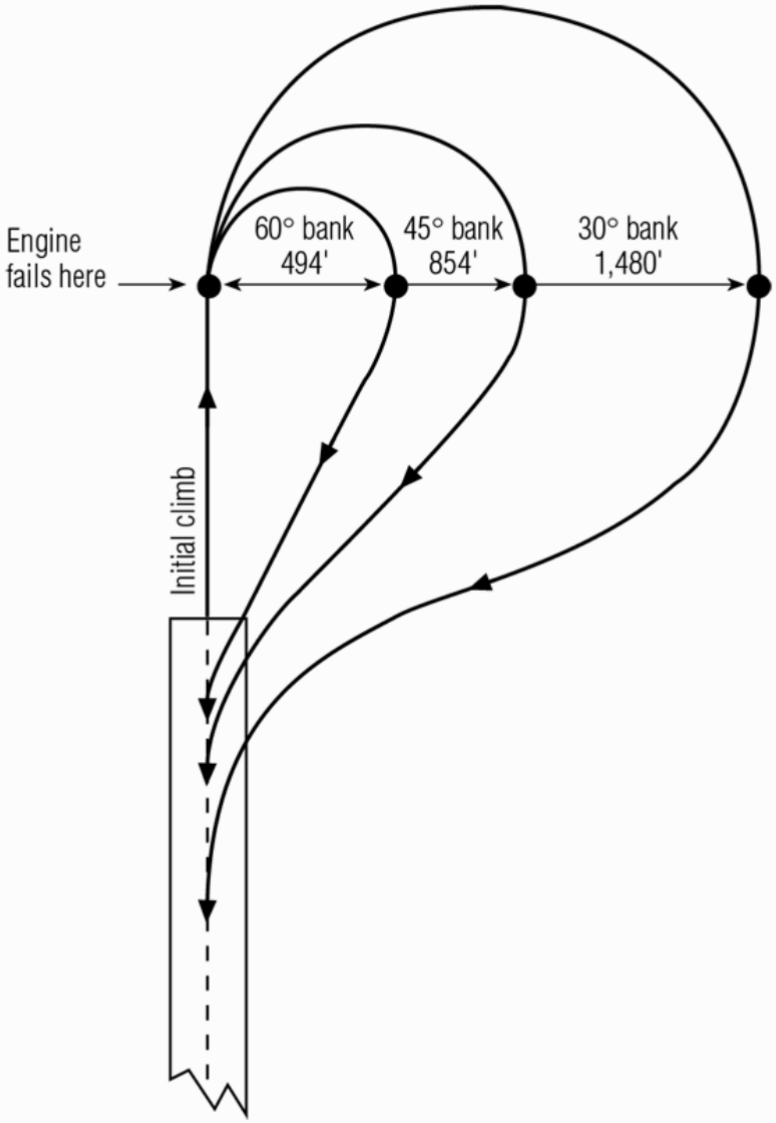
STEEP BANK

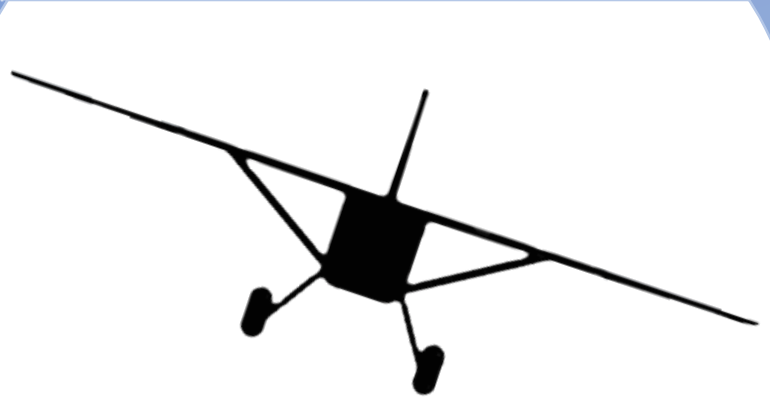


Bank Angle vs. Stall Speed

Bank Angle	Load Factor	Stall Speed Incr.
0º	1.0 G	0%
20º	1.06 Gs	3%
30º	1.15 Gs	7%
40º	1.31 Gs	14%
45º	1.41 Gs	19%
50º	1.56 Gs	25%
60º	2.0 Gs	41%
70º	2.92 Gs	71%

Bank Angle vs. Turn Radius

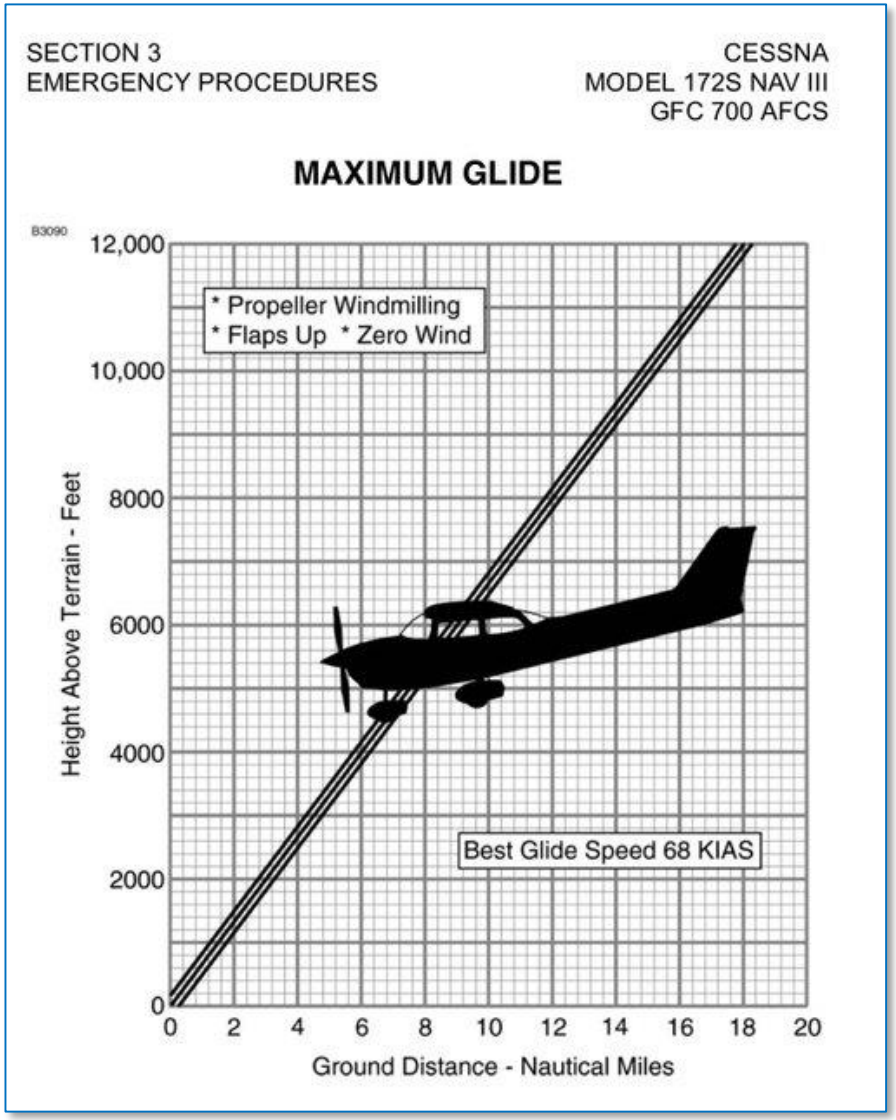




Step on the ball!

Slipping and Skidding

What Airspeed?

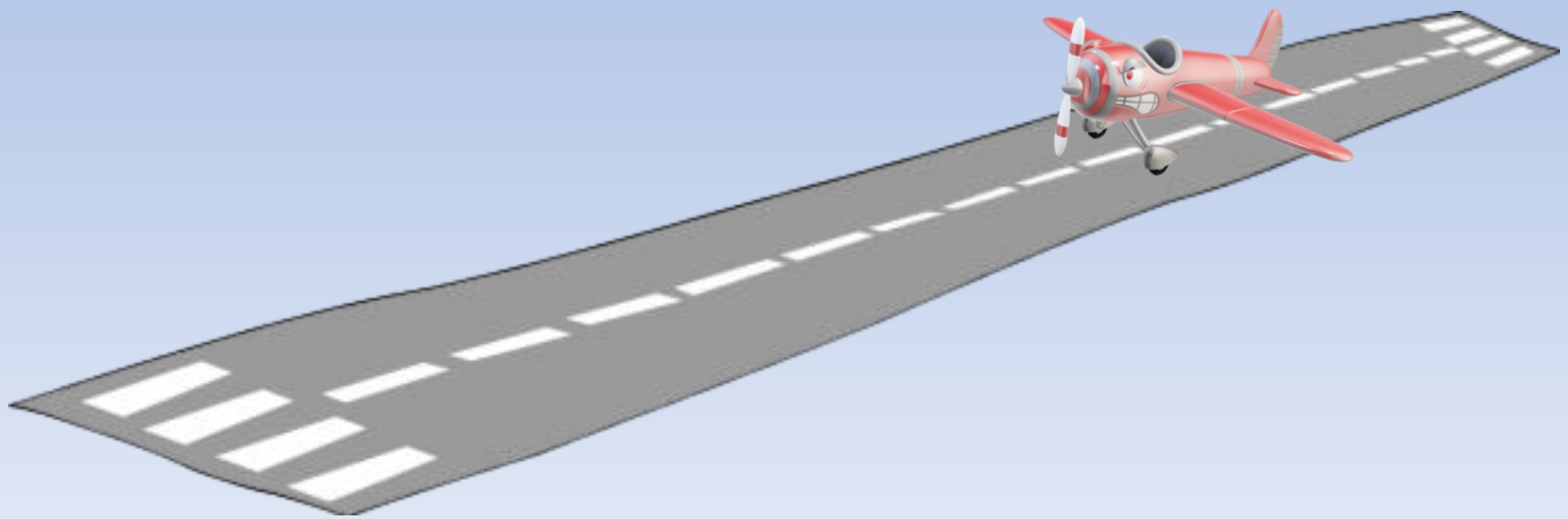


Respect the Stall Warning

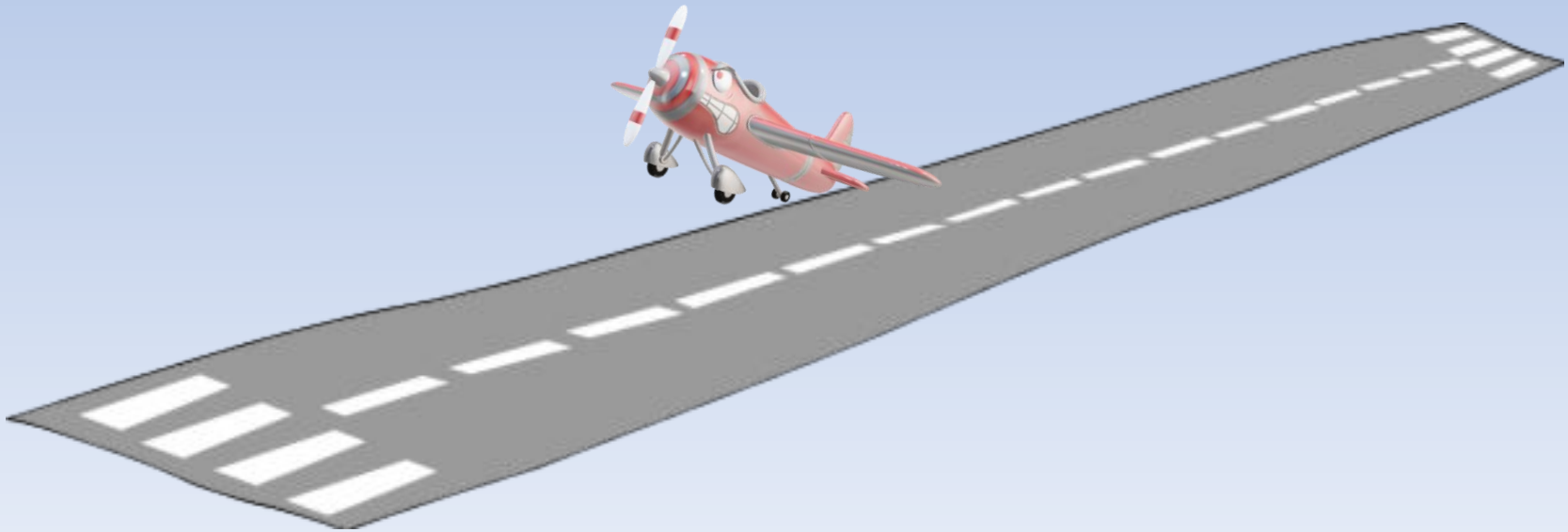
When you hear it –

Relax back-pressure on the control wheel to silence it.

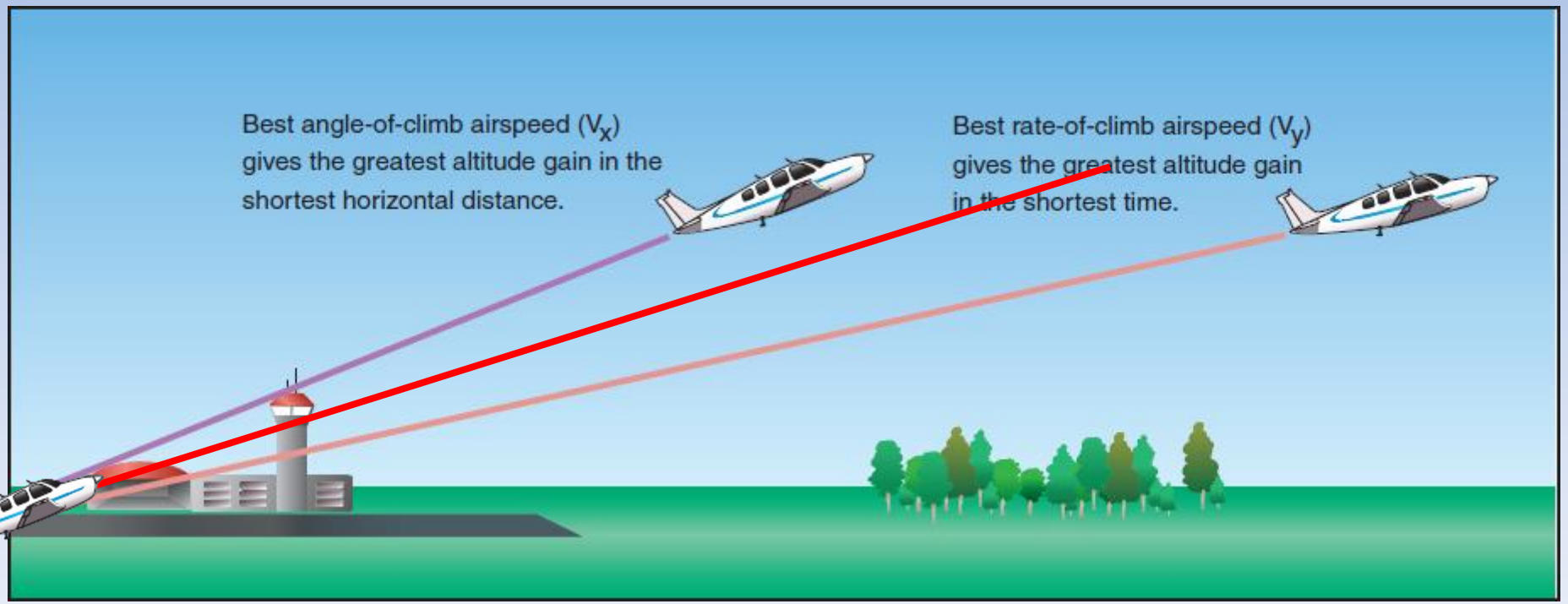
TAKEOFF ROLL



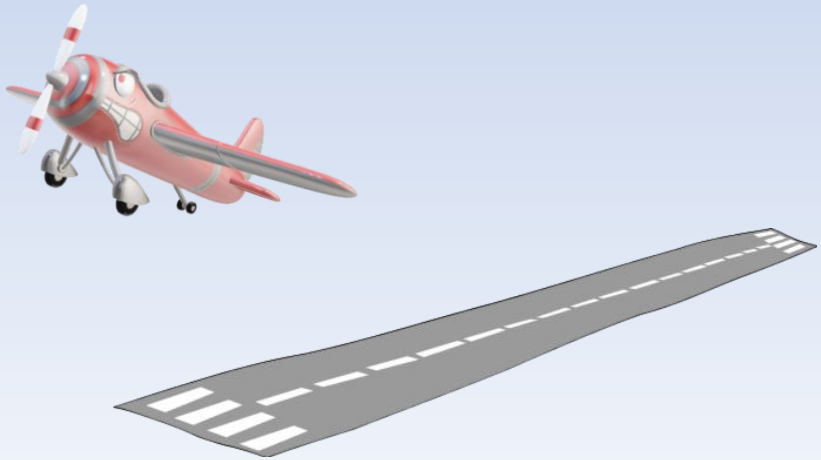
IMMEDIATELY AFTER LIFTOFF



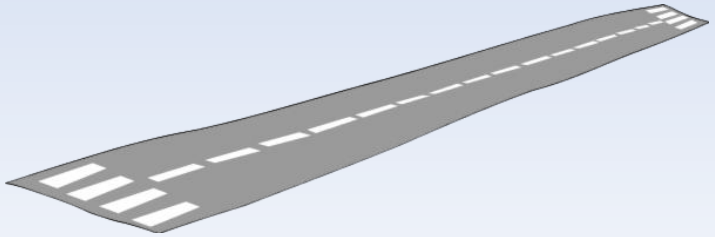
CLIMB SPEED?


Best angle-of-climb airspeed (V_x) gives the greatest altitude gain in the shortest horizontal distance.
Best rate-of-climb airspeed (V_y) gives the greatest altitude gain in the shortest time.

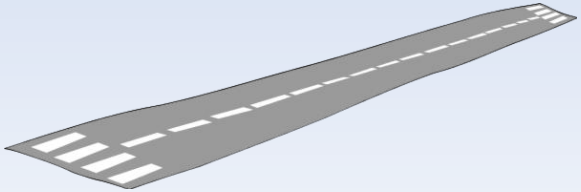
UNABLE TO LAND AND STOP



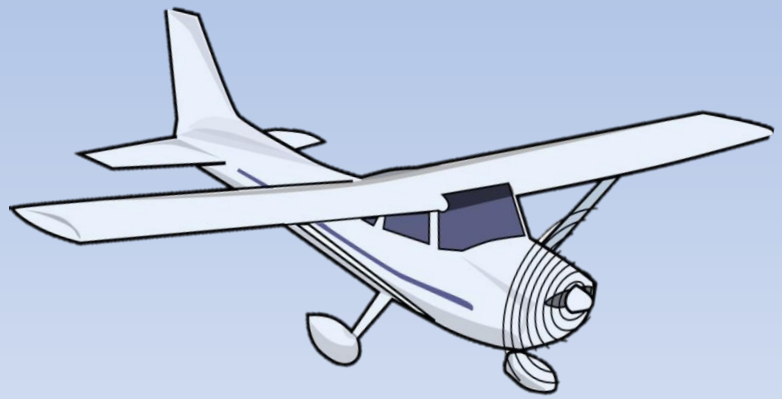
ALMOST HIGH ENOUGH TO TURN BACK

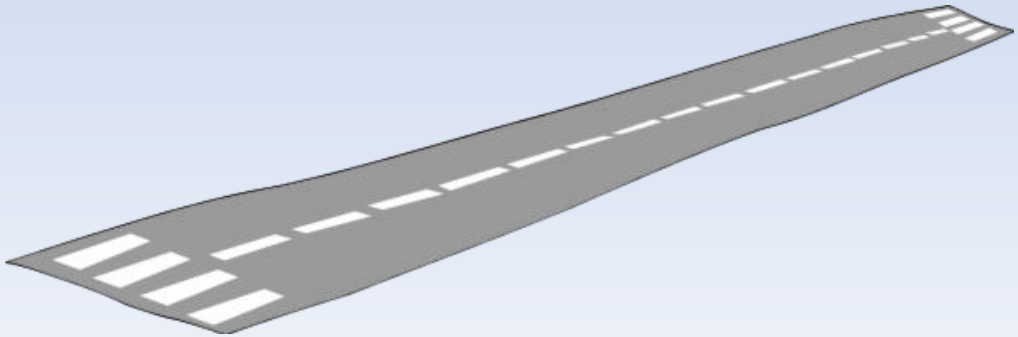


HIGH ENOUGH TO TURN BACK

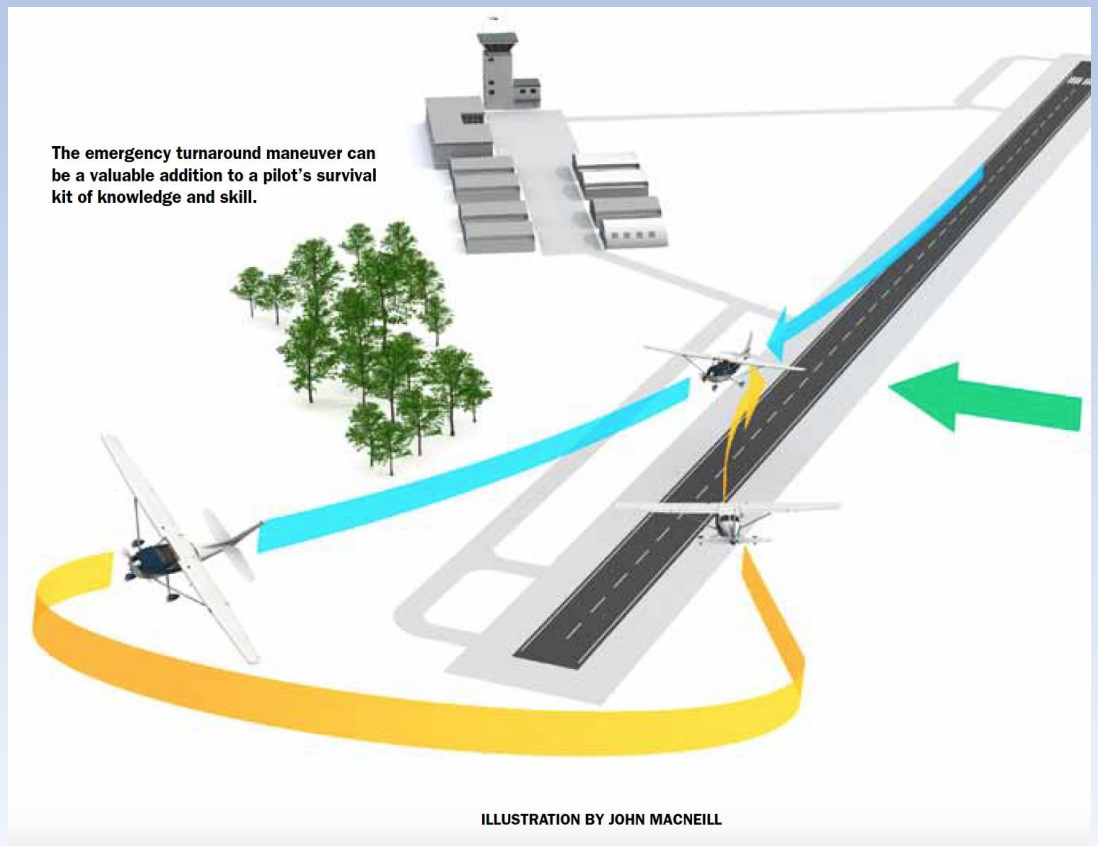


PARTIAL POWER LOSS

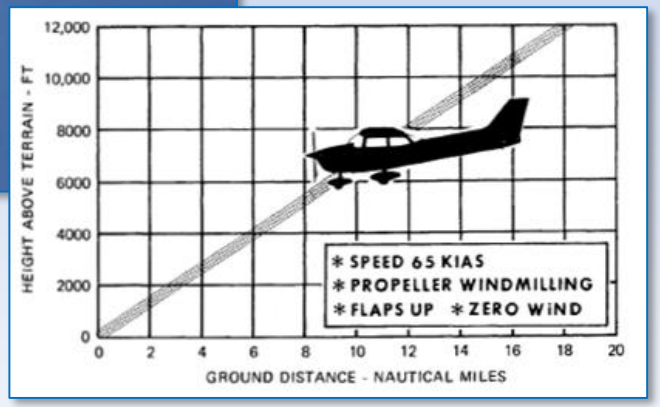




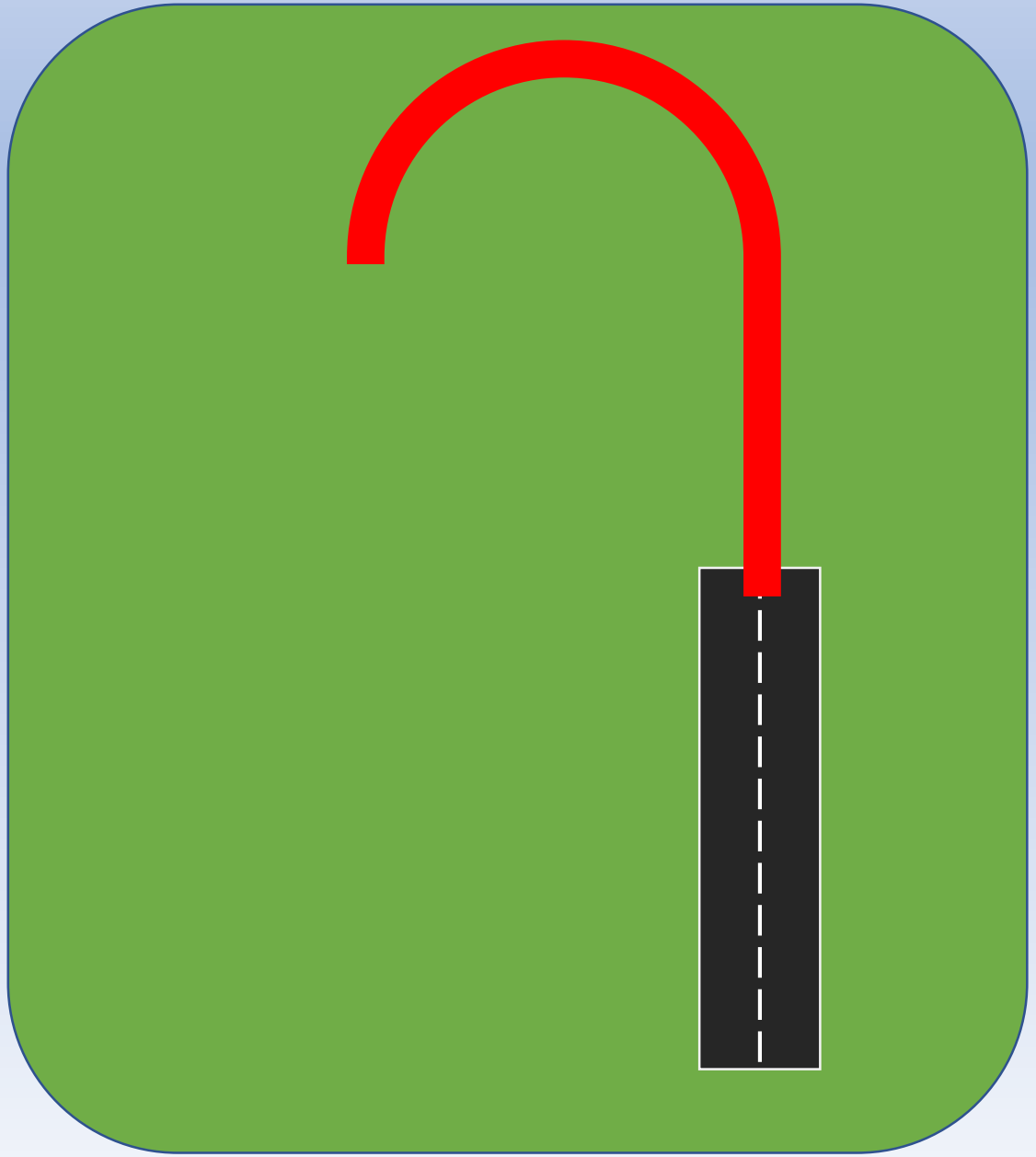
The Turnback Maneuver



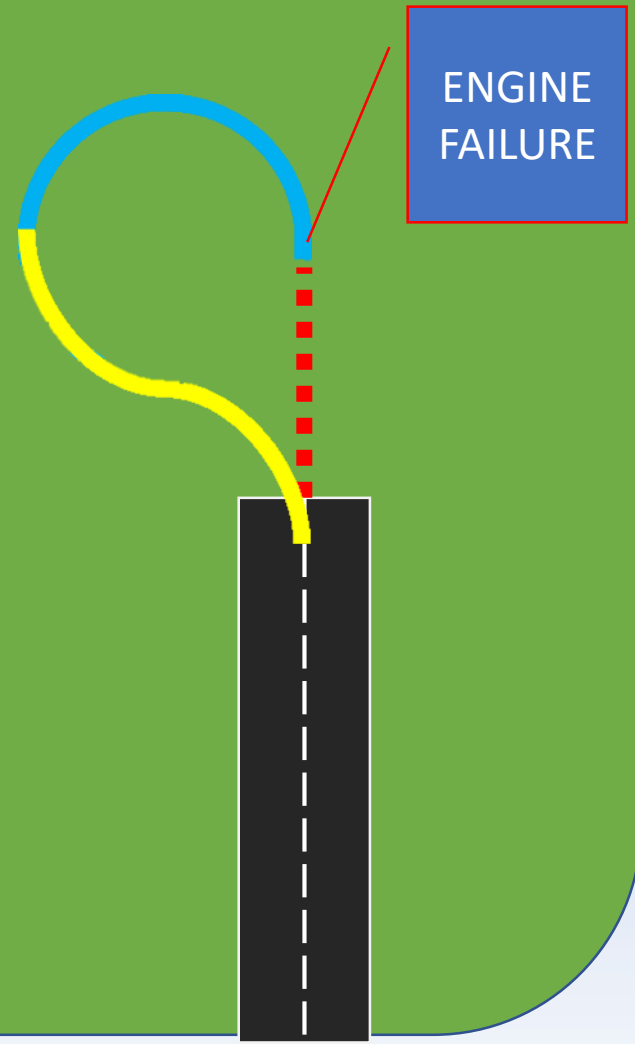
DETERMINING MINIMUM TURBACK ALTITUDE



180° Turn?



Why 360 Degrees?



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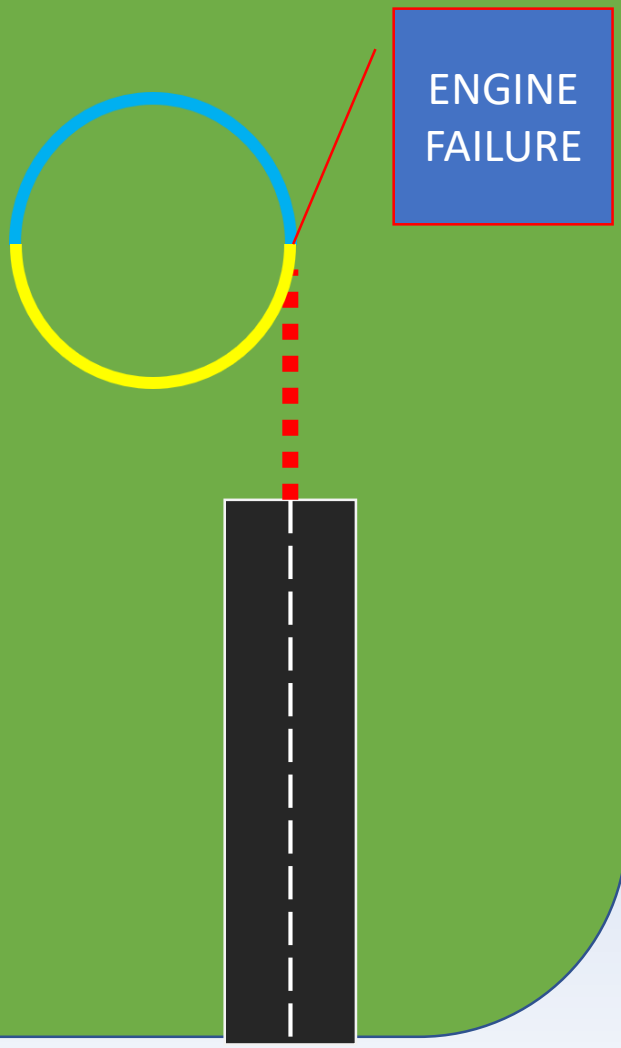

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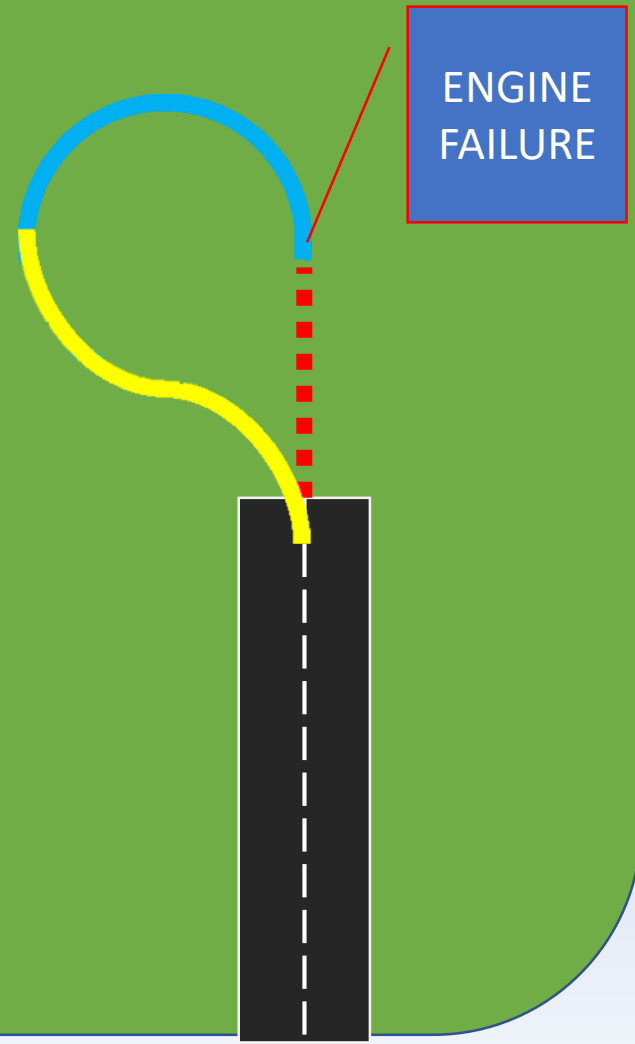

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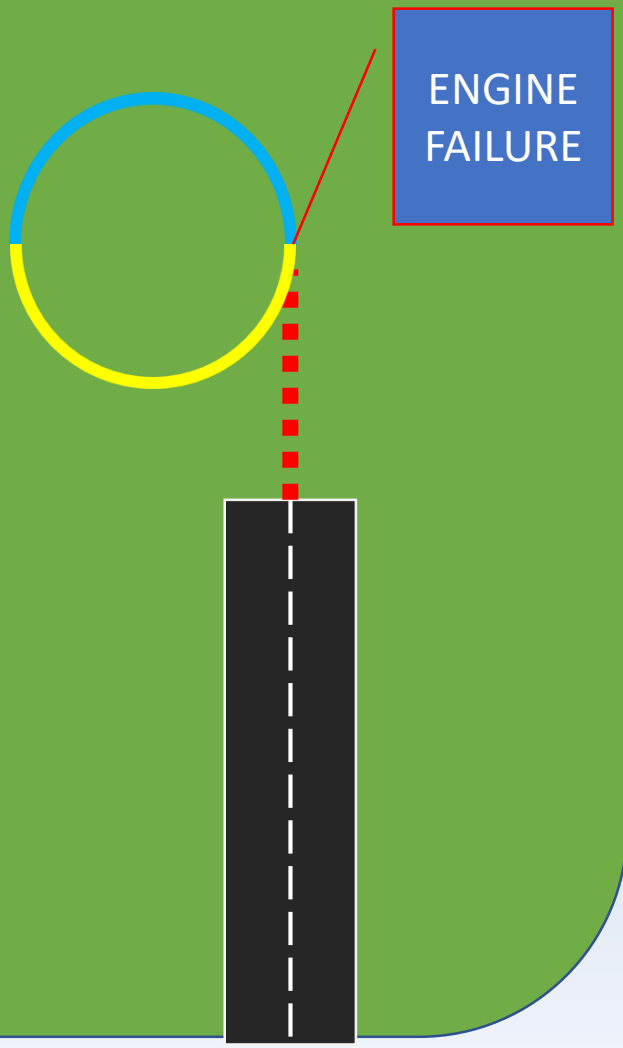

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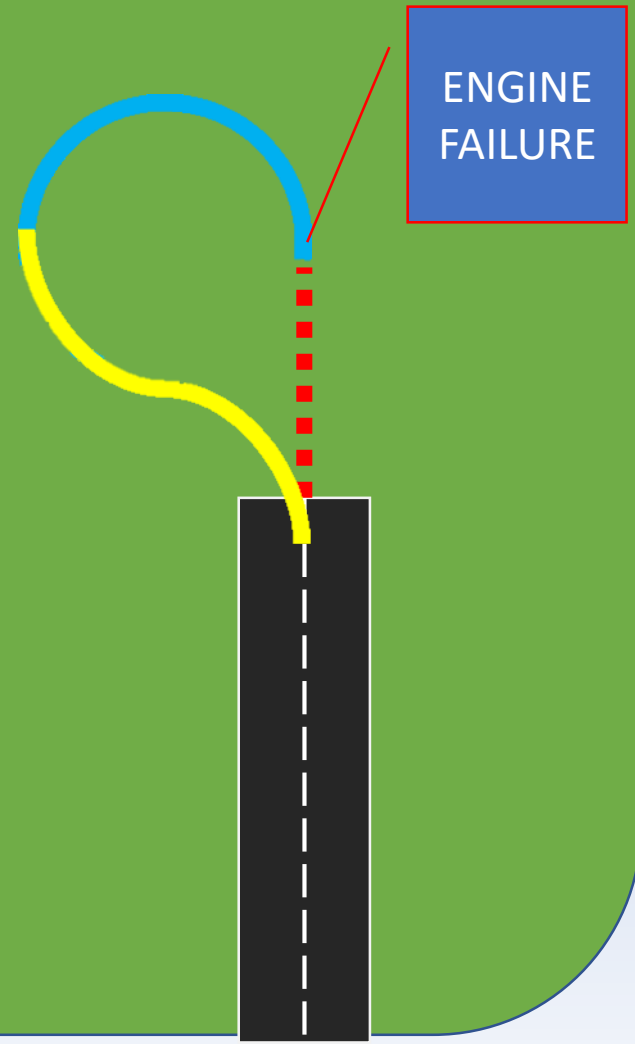

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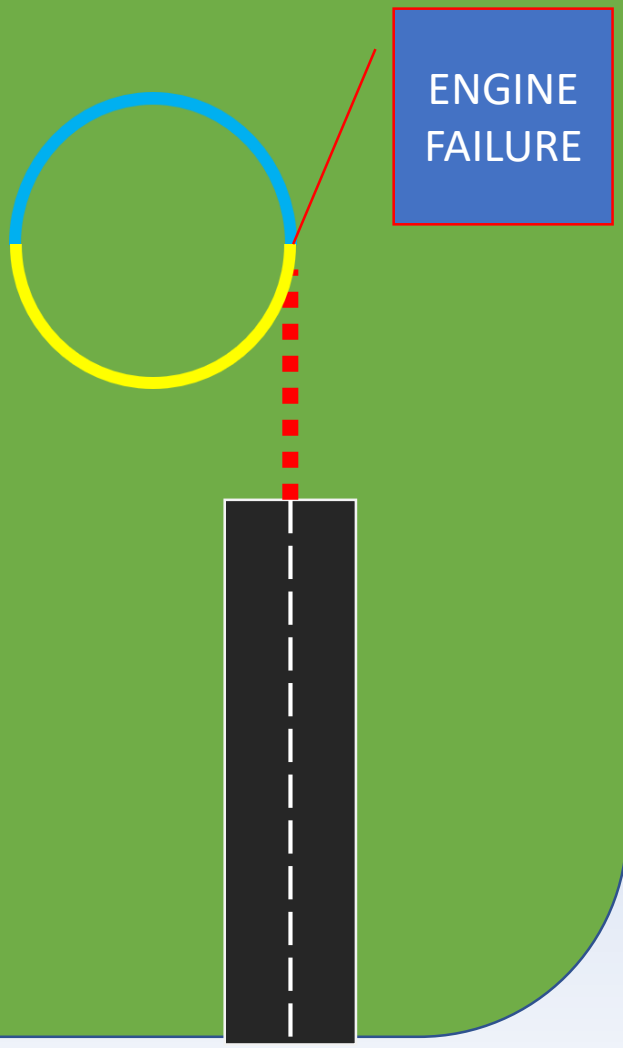

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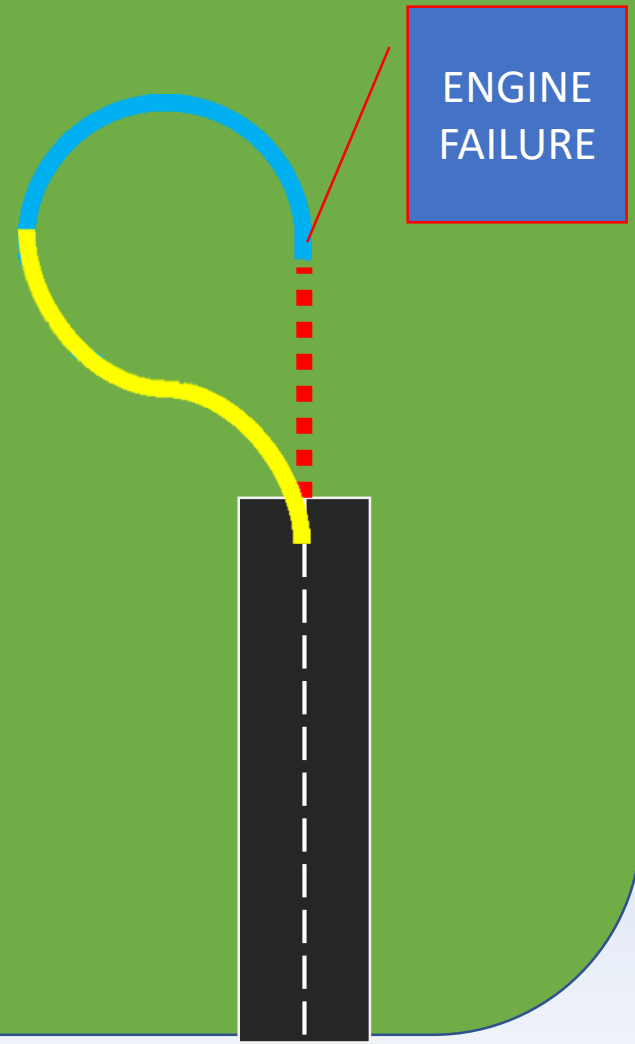

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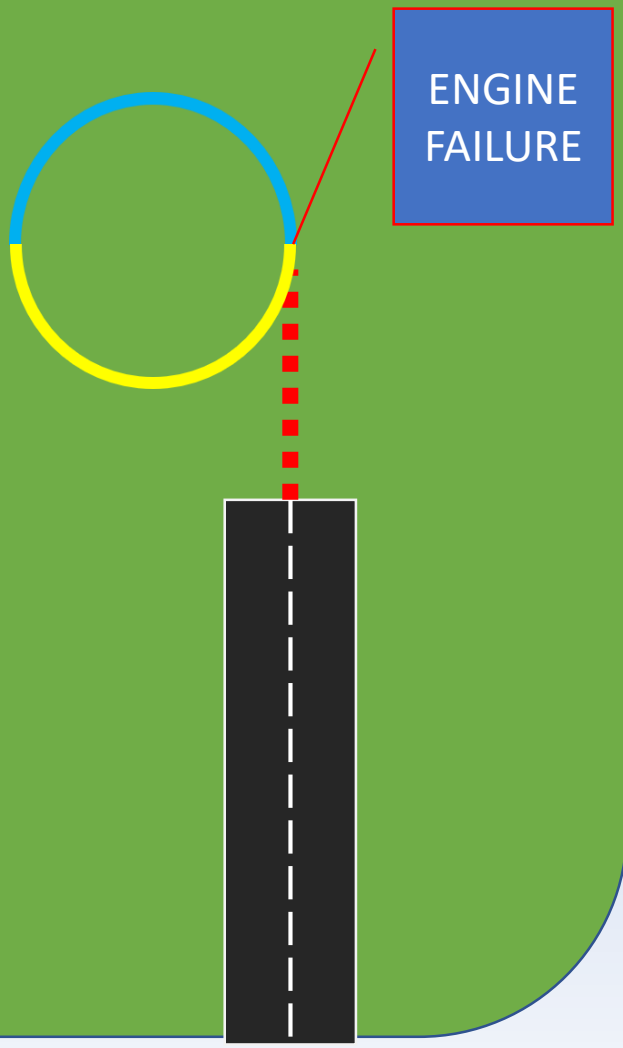

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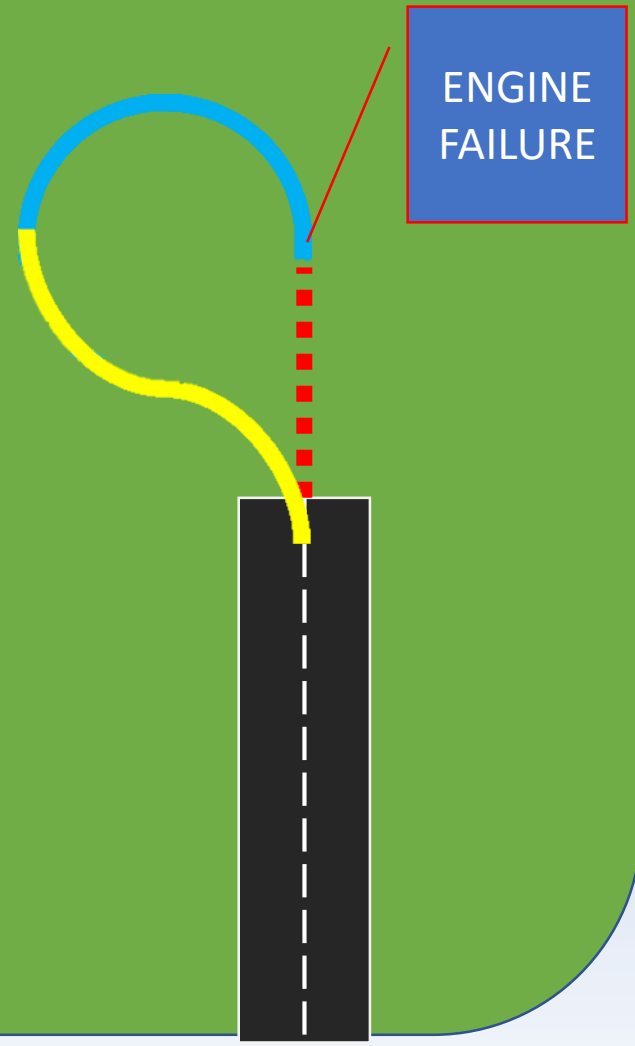


TURNBACK HEIGHT (AGL)

ALTITUDE LOSS WORKSHEET

For Practice at a Safe Altitude

CARDINAL ALTITUDE		3000
Minus ALTITUDE AT END OF MANEUVER.....	-	2400
Equals OBSERVED ALTITUDE LOSS	=	600
Add 50% SAFETY MARGIN	+	300
Equals minimum TURNBACK HEIGHT*	=	900

"OBSERVED ALTITUDE LOSS" = Altitude lost during a 360^{O} test turnback maneuver

The Runway

- Can’t be short
- Long runway is less risky
- How long?
  - 2/3 of *Observed Altitude Loss* by end of runway

TWO ALTITUDES TO KNOW BEFORE TAKEOFF

OBSERVED ALTITUDE LOSS		600
Multiply	x	2/3
MINIMUM HEIGHT OVER END OF RUNWAY ...	=	400
Add FIELD ELEVATION	+	620
MINIMUM ALTITUDE OVER END OF RUNWAY =		1020

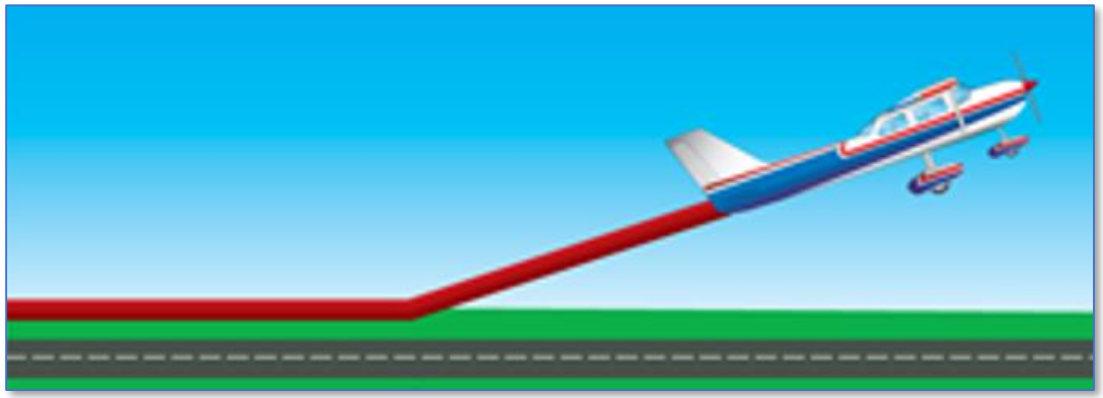
(If

TURNBACK HEIGHT*	=	900
Add FIELD ELEVATION	+	620
MINIMUM TURNBACK ALTITUDE	=	1520

SIMULATION VIDEO

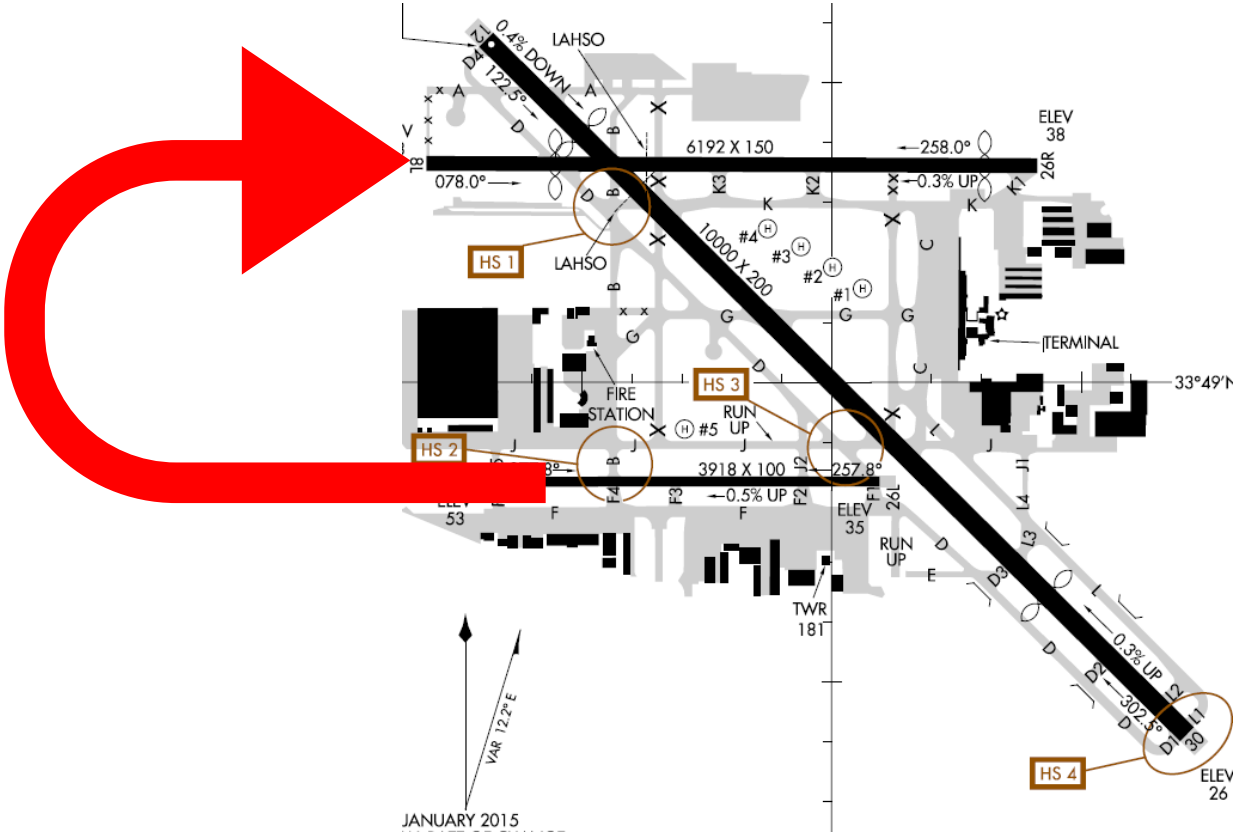
Takeoff Planning

- Straight or turnback?
- Hazards?
- Preparation
  - Decision prior to takeoff
- Conditions?
- Left or right turn?
  - Left crosswind
  - Right crosswind
  - Down the runway



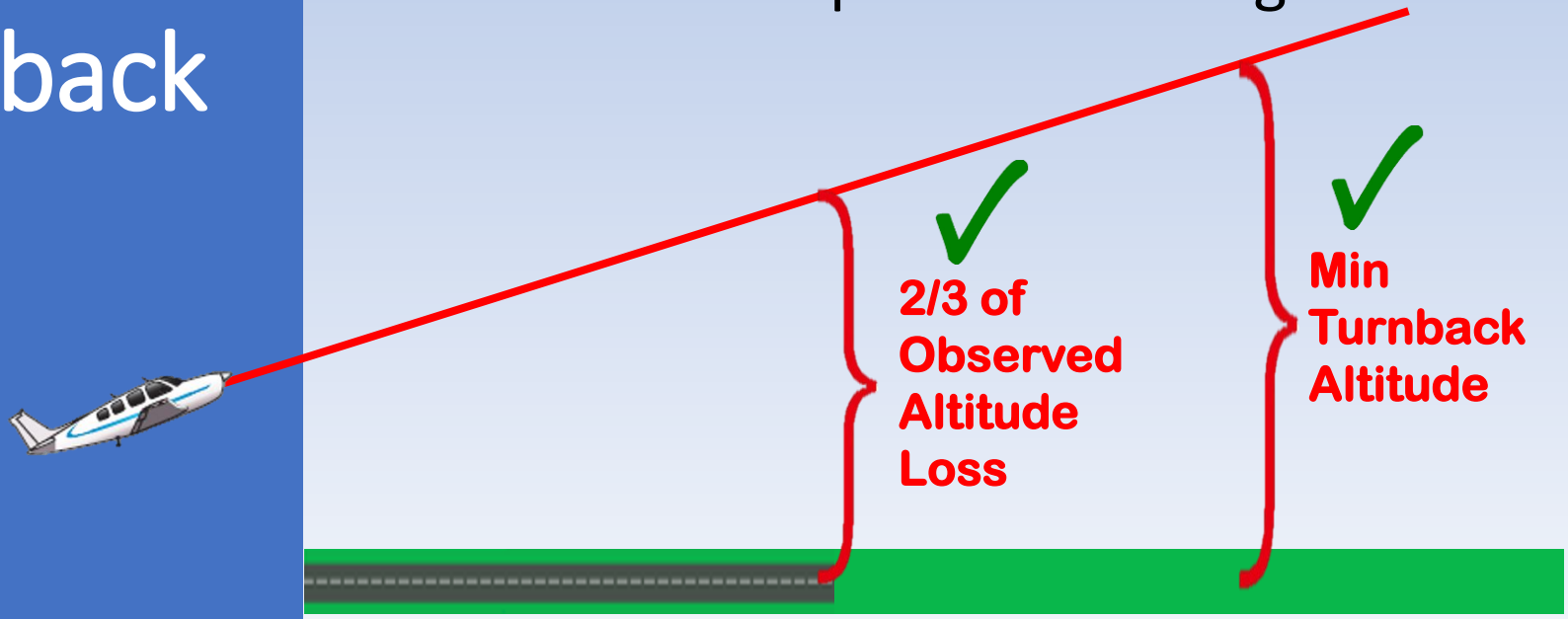
Takeoff Planning (Cont'd.)

- Parallel runway/taxiway?
- Be prepared

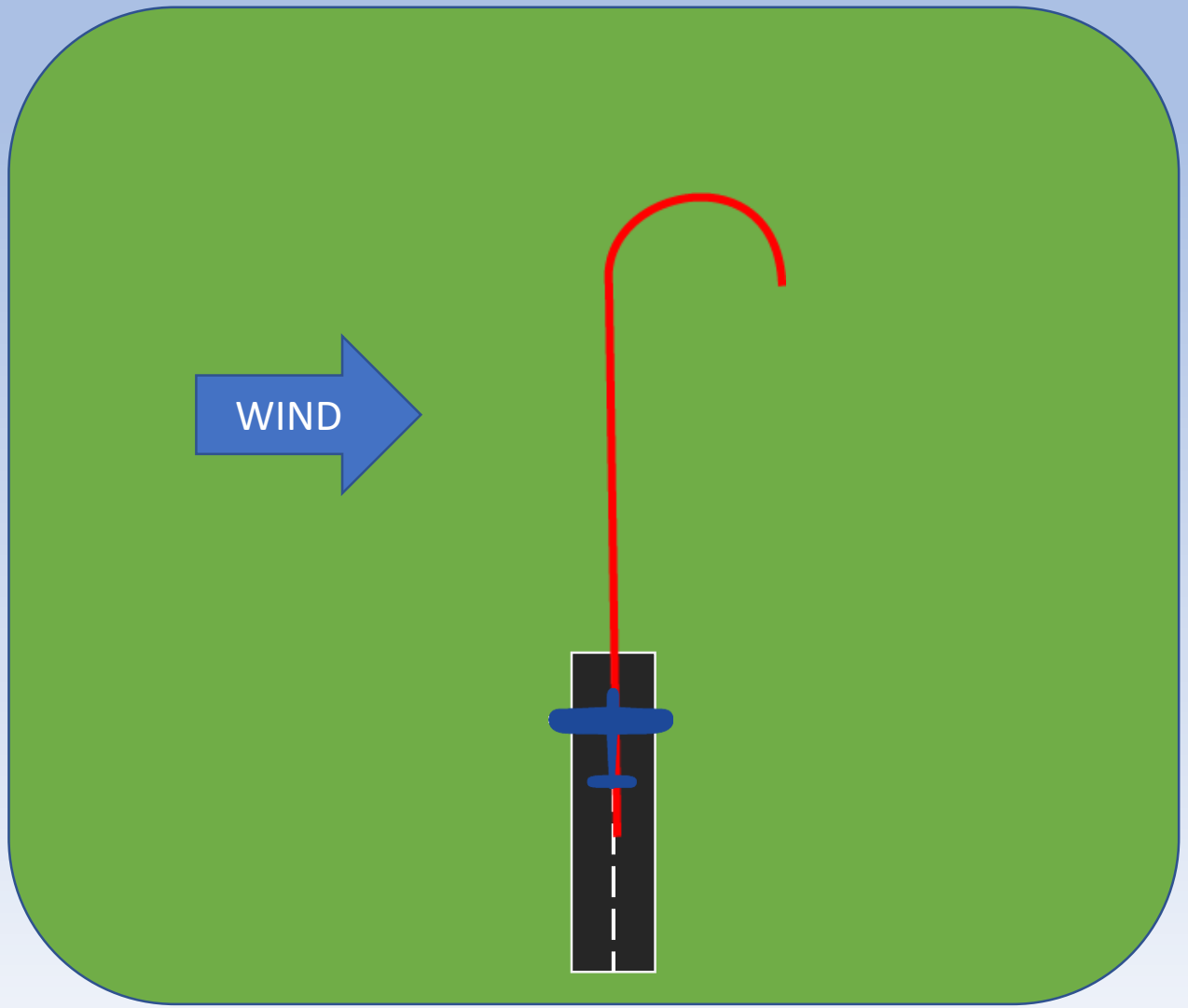


The Turnback

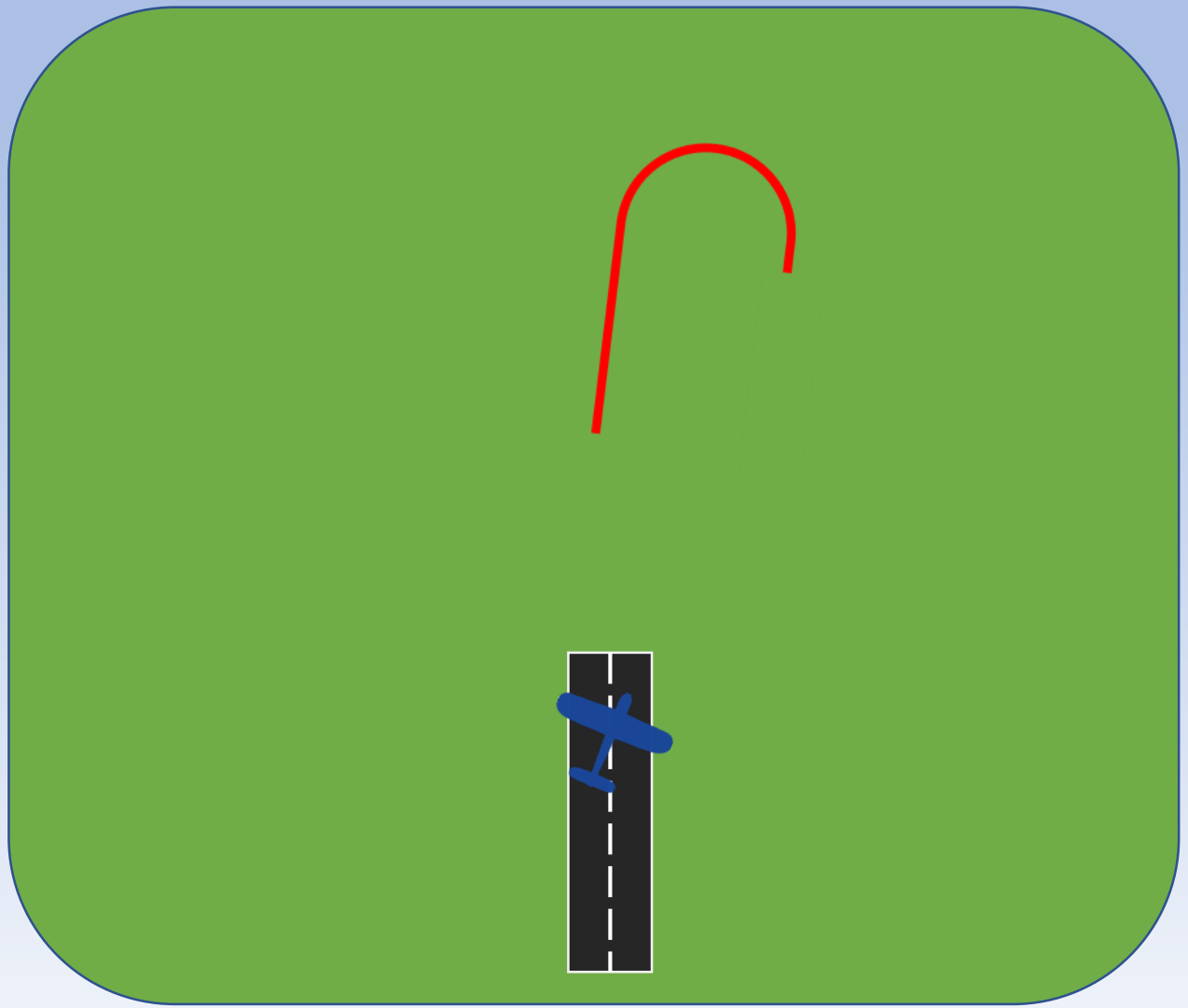
- 2/3 rule
- Min turnback altitude
- Engine fails
- Turnback
- Don’t crane your neck
- Appraise at 90^{O} point
- Never attempt to “stretch“ glide



DRIFT WITH WIND?



TEARDROP REVERSAL?



Touchdown

- Maximum braking!
- Raise flaps!
- Tailwheel – ground loop?
- Gear-up landing?

TEST FLIGHT


Please post your results
on my blog:
www.CaptainSchiff.com
The End

The Possible Turn

Captain Brian Schiff

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