NATIONAL ASSOCIATION OF FLIGHT INSTRUCTORS ENTROPY OF A SOCIATION OF FLIGHT INSTRUCTORS

LIVE



Welcome!



LIVE

Why We Teach What We Teach

The Reasons Behind Maneuvers and Regulations





Thomas P. Turner Executive Director, ABS Air Safety Foundation NAFI Life Member

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The Reasons Behind Maneuvers and Regulations



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Regulations

Title	Volume	Chapter	Browse Parts	Regulatory Entity
Title 14	1	I	1-59	FEDERAL AVIATION ADMINISTRATION,
Aeronautics	2		60-109	DEPARTMENT OF TRANSPORTATION
and Space	3		110-199	
	4	II	200-399	OFFICE OF THE SECRETARY, DEPARTMENT OF TRANSPORTATION (AVIATION PROCEEDINGS)
		III	400-1199	COMMERCIAL SPACE TRANSPORTATION, FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION
	5	V	1200-1299	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
		VI	1300-1399	AIR TRANSPORTATION SYSTEM STABILIZATION



Maneuvers

Title	Publication Date	Change Date	Status
Airline Transport Pilot and Type Rating for Airplane Airman Certification Standards (FAA-S-ACS-11)(Change 1) (PDF)	May 2019	5/28/2019	Effective June 28, 2019
Commercial Pilot — Airplane Airman Certification Standards (FAA-S-ACS- 7A) (PDF)	June 2018	n/a	Effective June 11, 2018
Commercial Pilot — Military Competence Airman Certification Standards (FAA-S-ACS-12) (PDF)	August 2018	n/a	Effective October 15, 2018
Instrument Rating Airman Certification Standards (FAA-S-ACS-8B) (PDF)	June 2018	n/a	Effective June 11, 2018
Private Pilot - Airplane Airman Certification Standards (FAA-S-ACS- 6B) (PDF)	June 2018	n/a	Effective June 11, 2018
Remote Pilot – Small Unmanned Aircraft Systems Airman Certification Standards (FAA-S-ACS-10A) (PDF)	June 2018	n/a	Effective June 11, 2018





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Why We Teach What We Teach

- VFR minimums
- Lazy 8
- Minimum safe altitudes
- VMC demonstration

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VFR Minimums



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VFR Minimums

"3 152s" and

"5 F-111s"









VFR Minimums

"3 152s" and "5 F-111s"

- <u>Three</u> miles visibility
- <u>1</u>000 feet above clouds
- <u>5</u>00 feet below clouds
- <u>2000</u> feet laterally from clouds
- Five miles visibility
- <u>1</u>000 feet above clouds
- <u>1</u>000 feet below clouds
- <u>1</u> mile laterally from clouds

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VFR Minimums

	Airspace	Altitude	Day/Night	Mnemonic
	Class A			No VFR
	Class B			Three miles, clear of clouds
"3 152s"	Class C			3 152s
and "5 5 111~"	Class D			3 152s
3 F-1115	Class E	< 10,000 MSL		3 152s
		<u>></u> 10,000 MSL		5 F-111s
	Class G	<u><</u> 1200 AGL	Day	1 mile, clear of clouds
			Night	3 152s
		> 1200 AGL but < 10,000 MSL	Day	1 mile, 152s
			Night	3 152s
TIVE		<u>></u> 10,000		5 F-111s

The *Real* Purpose of VFR Minimums

		Airspace	Altitude	Day/Night	Mnemonic
Clues	1	Class A			No VFR
Chaoc	2	Class B			Three miles, clear of clouds
		Class C			3 152s
		Class D			3 152s
		Class E	< 10,000 MSL		3 152s
	3		<u>></u> 10,000 MSL		5 F-111s
		Class G	<u><</u> 1200 AGL	Day	1 mile, clear of clouds
				Night	3 152s
			> 1200 AGL but < 10,000 MSL	Day	1 mile, 152s
				Night	3 152s
LIVE			<u>></u> 10,000		5 F-111s

It's not about loss of control...

...it's not about flying into obstacles....

... it's about separation from IFR traffic.



Lazy 8s

Performance Maneuvers

Introduction

Flight menerven that an initially taught to pilots an designed to be basis and minitially taught to pilots and designed to be basis and minitially taught statistic through their flight means, additional measurem as needed to develop beyond the fundamental. Performance measurem are intended to enhance a pilot's prificiency in flight control typics time, measurem planning, it matienal averages, and develop a statistical designed to that the application of measurem an grasenally designed to that the application of flight control pressures, attinuing, and and the application are constantly changing throughout the measurem.



Lazy 8s



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Lazy 8s

- Coordination of flight controls across a wide range of airspeeds and attitudes
- At no time are control pressures constant



But is there more to it?





"Rolling Gs"





"Rolling Gs"



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"Rolling Gs"





Minimum Safe Altitudes

§91.119 Minimum safe altitudes: General.

Except when necessary for takeoff or landing, no person may operate an aircraft below the following altitudes:

(a) Anywhere. An altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.

(b) Over congested areas. Over any congested area of a city, town, or settlement, or over any open air assembly of persons, an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.

(c) Over other than congested areas. An altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

(d) Helicopters, powered parachutes, and weight-shift-control aircraft. If the operation is conducted without hazard to persons or property on the surface-

(1) A helicopter may be operated at less than the minimums prescribed in paragraph (b) or (c) of this section, provided each person operating the helicopter complies with any routes or altitudes specifically prescribed for helicopters by the FAA; and

(2) A powered parachute or weight-shift-control aircraft may be operated at less than the minimums prescribed in paragraph (c) of this section.



Minimum Safe Altitudes

Clues

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Over any congested area...or open air assembly of persons....



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Over other than congested areas...



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4 ...over open water or sparsely populated areas... [no] closer than 500 feet to any person....





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5 Helicopters, powered parachutes and weight-shift....





What do these have in common?

- 1...if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.
- Over any congested area...or open air assembly of persons....
- Over other than congested areas...
- 4...over open water or sparsely populated areas... [no] closer than 500 feet to any person....
- 5 Helicopters, powered parachutes and weight-shift....





Minimum Safe Altitudes

14 CFR 91.119

Not about protecting pilots or even passengers

About protecting *persons on the ground* from falling airplanes









- At least 3000 AGL
- Gear UP
- Flaps TAKEOFF
- Slow to Vsse or Vyse (whichever is higher)
- Critical engine idle, propeller windmilling
- "Good" engine to takeoff power

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- Bank 5^o into good engine
- Slow 1 knot/second
- Slowly increase pitch
- Decelerate to when FULL right rudder and 5° bank cannot counteract asymmetric thrust
- Airplane begins to yaw uncontrollably to the left

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RECOVER

Simultaneously:

- Reduce power on good engine
- Decrease pitch
- Stop yaw
- Maintain heading
- Minimum altitude loss

LIVE













RECOVER

At the *FIRST* sign of:

- Loss of directional control;
- Stall warning or indication; or
- Decreased power on the good engine

LIVE





RECOVER

Simultaneously:

- Reduce power on good engine
- Decrease pitch
- Stop yaw
- Maintain heading
- Minimum altitude loss

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$V_{\text{MC}} \, \text{Demonstration}$



Federal Aviation Administration

Airman Certification Standards

X. Multiengine Operations

Task	B. Vuc Demonstration (AMEL, AMES)					
References	FAA-H-8083-2, FAA-H-8083-3, FAA-P-8740-66, POH/AFM					
Obligation	To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a V_{NC} demonstration.					
Objective	Note: See Appendix 5: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operational Requirements & Limitations					
Knowledge	The applicant demonstrates understanding of:					
CA.X.B.K1	Factors affecting V _M : and how V _M : differs from stall speed (V ₅).					
CAXEK2	V _{MC} (red line), V _{YSE} (blue line), and V _{SSE} (safe single-engine speed)					
CA X.B.K3	Cause of loss of directional control at airspeeds below Vuc.					
CAXEK4	Proper procedures for maneuver entry and safe recovery.					
Risk Management	The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing					
CAXER!	Improper airplane configuration.					
CA.X.B.R2	Maneuvering with one engine inoperative.					
CA.X.B.R3	Distractions, loss of situational awareness, and/or improper task management.					
Skills	The applicant demonstrates the ability to:					
CA.X.B.S1	Configure the airplane in accordance with the manufacturer's recommendations, in the absence of the manufacturer's recommendations, then at Vsse/Vyse, as appropriate, and					
CA.X.B.Sfa	a. Landing gear retracted					
CA.X.B. S16	b. Flaps set for takeoff					
CAXE Stc	c. Cowl flaps set for takeoff					
CA X B Std	d. Trim set for takeoff					
CA.X.B.Ste	e. Propellers set for high RPM					
CAXES1/	f. Power on critical engine reduced to idle and propeller windmilling					
CA.X.B.S1g	g. Power on operating engine set to takeoff or maximum available power					
CA.X.B S2	Establish a single-engine climb attitude with the airspeed at approximately 10 knots above V ₃₅₆					
CA.X.B.S3	Establish a bank angle not to exceed 5 ^e toward the operating engine, as required for best performance and controllability.					
CA.X.B.S4	Increase the pitch attitude slowly to reduce the airspeed at approximately 1 knot per second while applying rudder pressure to maintain directional control until full rudder is applied.					
CAX8 S5	Recognize indications of loss of directional control, stall warning, or buffet.					
CA X.B. 56	Recover promptly by simultaneously reducing power sufficiently on the operating engine while decreasing the angle of attack as necessary to regain airspeed and directional control. Recovery should not be attampted by increasing the power on the simulated failed engine.					
CA.X.B.S7	Recover within 20° of entry heading.					
CA.X.B.S8	Advance power smoothly on the operating engine and accelerate to V _{SSE} /V _{YSE} as appropriate, 15 knots during recovery.					





$V_{\text{MC}} \, \text{Demonstration}$



of Transportation

Federal Aviation Administration

Airman Certification Standards



"Checkride circus trick"

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X. Multiengine Operations

Task	B. Vuc Demonstration (AMEL, AMES)						
References	FAA-H-8083-2, FAA-H-8083-3; FAA-P-8740-66; POH/AFM						
Objective	To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with a $V_{\rm MC}$ demonstration.						
	Note: See Appendix 6: Safety of Flight and Appendix 7: Aircraft, Equipment, and Operation Requirements & Limitations						
Knowledge	The applicant demonstrates understanding of.						
CA.X.B.K1	Factors affecting V _{MC} and how V _{MC} differs from stall speed (V _S).						
CA.X.B.K2	V _{MC} (red line), V _{YSE} (blue line), and V _{SSE} (safe single-engine speed).						
CA.X.B.K3	Cause of loss of directional control at airspeeds below Vac						
CA.X.B.K4	Proper procedures for maneuver entry and safe recovery.						
Risk Management	The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing						
CA.X.5.R1	Improper airplane configuration.						
CAXBR2	Maneuvering with one engine inoperative						
CAXBR3	Distractions, loss of situational awareness, and/or improper task management.						
Skills	The applicant demonstrates the ability to:						
CAXBS1	Configure the airplane in accordance with the manufacturer's recommendations, in the absence of the manufacturer's recommendations, then at Vase/Vyse, as appropriate, and:						
CA.X.B.S1a	a. Landing gear retracted						
CA.X.B.S1b	b. Flaps set for takeoff						
CAXB Stc	c. Cowl flaps set for takeoff						
CA.X.B.S1d	d. Trim set for takeoff						
CA.X.B.S1e	e. Propellers set for high RPM						
CA.X.B.Stf	 Power on critical engine reduced to idle and propeller windmilling 						
CA.X.B.Stg	g. Power on operating engine set to takeoff or maximum available power						
CA.X.B S2	Establish a single-engine climb attitude with the airspeed at approximately 10 knots above V _{SSE}						
CA X.B S3	Establish a bank angle not to exceed 5° toward the operating engine, as required for best performance and controllability.						
CA.X.B.S4	Increase the pitch attitude slowly to reduce the airspeed at approximately 1 knot per second while applying rudder pressure to maintain directional control until full rudder is applied.						
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CA.X.B.S7	Recover within 20° of entry heading.						
CA.X.B.S8	Advance power smoothly on the operating engine and accelerate to V _{SSE} /V _{YSE} , as appropriate, ±5 knots during recovery.						



$V_{\mbox{\scriptsize MC}}$ Demonstration: The Real Lesson



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ANY Single-engine operation At the **FIRST** sign of:

- Loss of directional control;
- Stall warning or indication; or
- Decreased power on the good engine

RECOVER using the VMC recovery technique



V_{MC} Demonstration: The Real Lesson



V_{MC} Demonstration: The Real Lesson





Why We Teach What We Teach

- Regulations
- Maneuvers







Why We Teach What We Teach

- VFR minimums
- Lazy 8
- Minimum safe altitudes
- VMC demonstration

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Why We Teach What We Teach

Why?

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		VI	1300-1399	AIR TRANSPORTATION SYSTEM STABILIZATION





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Thanks for Watching!



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