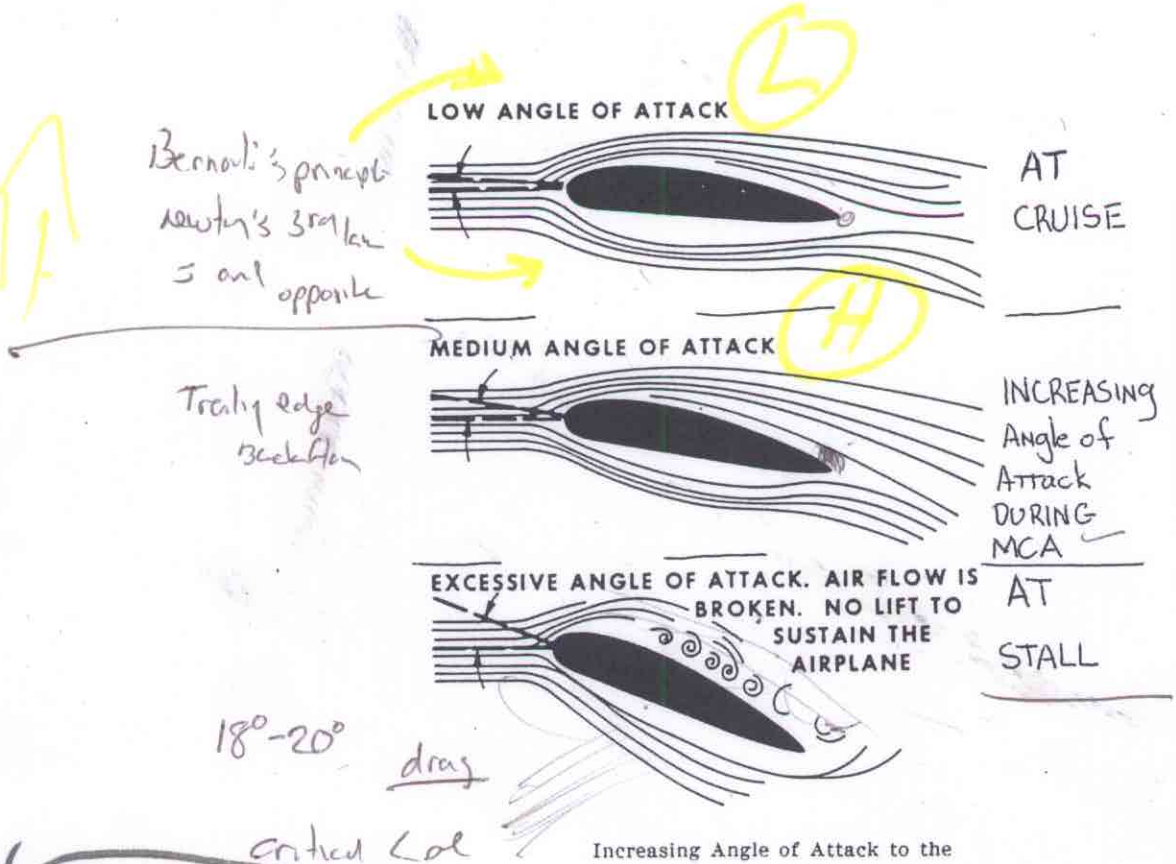
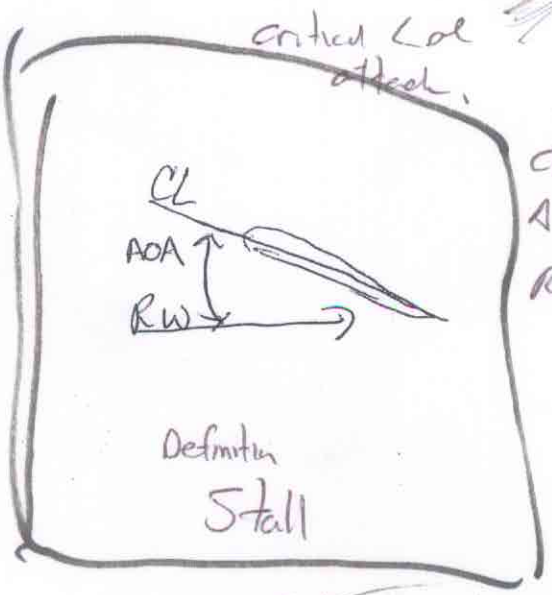


Increasing Angle of Attack to the Stall Point



Relative Wind:

Wind created by moving through air - opposite direction of motion

LESSON MCA - SLOW FLIGHT **STUDENT** **DATE**

OBJECTIVE

★ TO DEVELOP ONE'S ABILITY TO FLY THE AIRPLANE AT MINIMUM CONTROLLABLE AIRSPEED IN VARIOUS CONFIGURATIONS, AND ONE'S AWARENESS OF IMMINENT STALLS.

ELEMENTS

★ CONTROL OF THE AIRPLANES:
ATTITUDE, ALTITUDE, HEADING, & POWER

- PROPER USE OF CONTROLS
- RECOGNITION OF WING BUFFET AND STALL HORN
- RECOVERY PROCEDURE

SCHEDULE

★

PRE-FLIGHT	=>	:10	IMMINENT STALL	=>	:15
MCA STRAIGHT	=>	:20	FULL STALLS	=>	:15
MCA TURNING	=>	:20	POST FLIGHT	=>	:10

TOTAL TIME => 1:30

INSTRUCTOR'S ACTIONS

★ ORAL DESCRIPTION OF ELEMENTS & COMMON ERRORS:

1. RELATIONSHIP OF CONFIGURATION, WT, C.G., MANEUVERING LOADS, ANGLE OF BANK, & POWER TO FLIGHT CHARACTERISTICS & CONTROLLABILITY
2. RELATIONSHIP OF THE MANEUVER TO CRITICAL FLIGHT SITUATIONS, SUCH AS GO-AROUNDS
3. PERFORMANCE OF THE MANEUVER IN VARIOUS LDG GEAR & FLAP CONFIGURATIONS DURING STRAIGHT-AND-LEVEL FLIGHT & LEVEL TURNS
4. SPECIFIED AIRSPEED FOR THE MANEUVER
5. COORDINATION OF FLIGHT CONTROLS
6. TRIM TECHNIQUE
7. RE-ESTABLISHMENT OF CRUISE FLIGHT
8. INSTRUCTOR DEMO

STUDENTS'S ACTIONS

★ PRACTICE, ASK QUESTIONS AND FILL OUT HANDOUT

COMPLETION STANDARDS

★ ONE SHOULD DEMONSTRATE THE ABILITY TO FLY THE PLANE AT MCA IN VARIOUS CONFIGURATIONS, AND RECOGNIZE STALLS AND ABLE TO RECOVER FROM THEM.

LIMITATIONS: FOR PRIVATE / COMMERCIAL

* MAINTAINS AT LEAST 1,500 FEET AGL		
* HEADING	+/- 10°	FOR BOTH
* BANK ANGLE	+/- 10°	COM. +/- 5°
* ALTITUDE	+/- 100'	COM. +/- 50'
* MCA A/S	+ 5 kt	COM. +/- 5 kts

MCA A/S => ABOVE STALL => VS1 +/-

COMMON ERRORS

★ FAILURE TO MAINTAIN PROPER AIRSPEED, INADEQUATE POWER, HDG, & ALT, CONTROL INADVERTENT STALLS, POOR COORDINATION

3. Describe the procedure for operation at MCA.

a. Perform clearing turns.

b. Perform a pre-maneuver checklist (GUMPS).

c. Establish a specific heading and altitude (no lower than 1,500 feet AGL).

d. Reduce power from cruise to slow airplane to gear and/or flap operating range.

e. Extend gear (if retractable); extend flaps and adjust pitch attitude to maintain altitude. Retrim aircraft.

f. As the airspeed approaches V_{SO}, utilize power to control altitude and pitch to control airspeed (area of reverse command).

g. Continually cross-check the heading indicator, altimeter, airspeed indicator and vertical airspeed indicator, as well as outside references, to ensure accurate control is maintained.

h. Right rudder should be applied to correct for left turning tendencies.

i. Establish left and right turns (15° bank), climbs and descents while in slow flight.

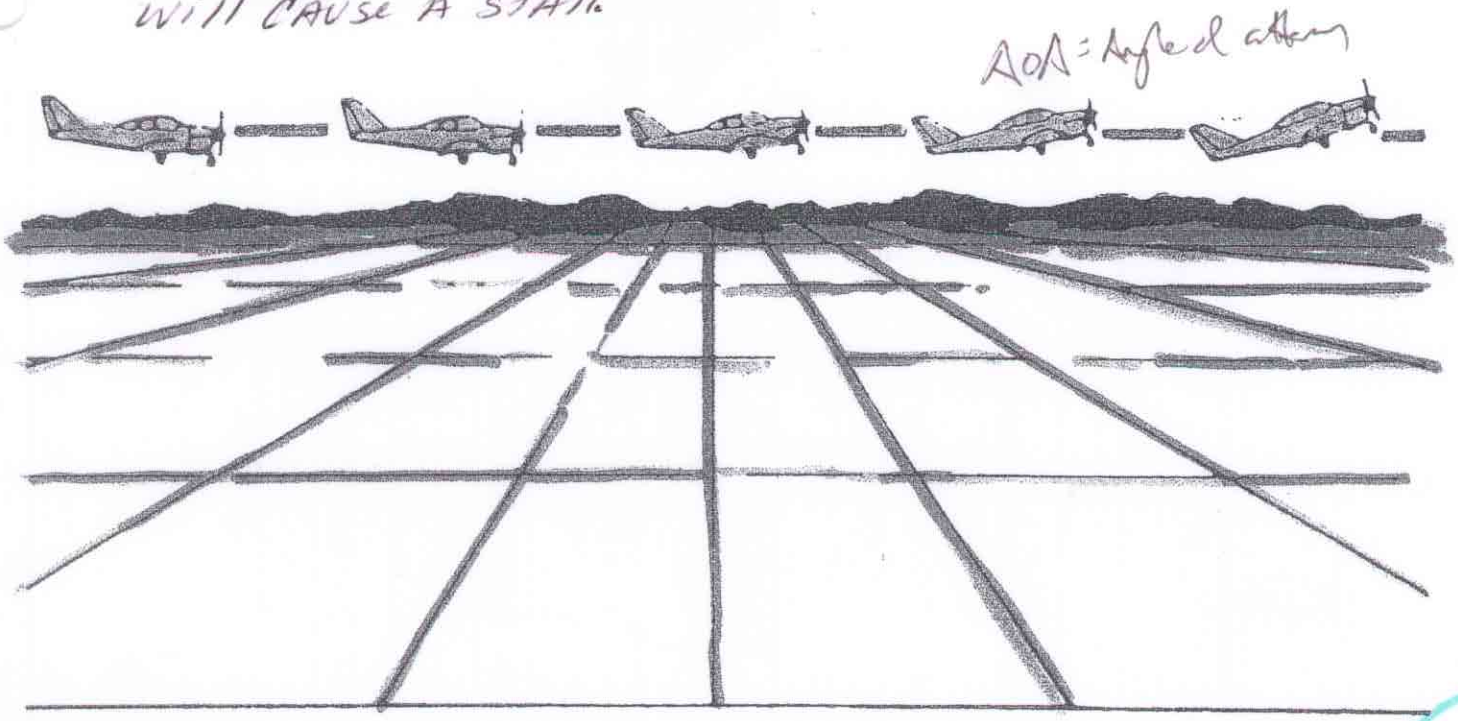
Recovery:

a. Apply full power.
b. Reduce flaps 10 degrees at a time.
c. Maintain heading and altitude.
d. As airspeed increases, retract gear and any remaining flaps.
e. Retrim aircraft for cruise flight.

Slow FLT is any A/S below Cruise Speed.

~~MINIMUM CONTROLLABLE AIRSPEED "MCA"~~ ~~Is Maneuvering the A/C in various configurations at a speed just above stall speed, without stalling. It's the min. airspeed at which control is maintained.~~

We are doing MCA
MCA is An A/S AT which Any increase in Load FACTOR OR AOA will CAUSE A STALL



Why: Slow flight is Practiced to develop an awareness of the aircraft's control characteristics at lower airspeeds.
MCA → To develop the students Sense of Feel along with the ability to use the controls correctly in performaning maneuvers in which very low airspeeds are required.

How to do it:

1. Point:
   - Not in a congested area
   - Emergency Landing Area is available
2. Altitude:
   - 3,000' AGL and completed no lower than 1500' AGL
3. Set Up: 18" 2400 / 120mph Premanv
   - Clearing Turns, ~~A-GUMPS~~, Cruise Speed
4. Entry:
   - ~~Carb. Heat (ON)~~
   - Power (~~1500 RPM~~) 15"
   - Increase Back Pressure to Maintain Altitude When A/S is in the White Arc
   - below 150 → Lower Gear
   - Slowly Extend Full Flaps
   - As A/S approaches ~~MCA (1.2 Vs1)~~ VSO increase power to maintain altitude
   - ~~carb. Heat (OFF)~~
5. Configurations:
   - Turns - Max B/A of 10°
   - Climbs
   - Descents
6. Recovery:
   - Maintain Altitude
   - Full Power
   - Lower Nose to the Horizon
   - Retract Flaps Slowly 10[illegible]
   - Retract Gear
   - Resume Normal Cruise Speed

PTS
common: ① entry altitude above 1500 ft AGL ② rolls out ±10°

	Bank ∠	± 10°
		Comm
A/S	1.2 Vs1	± 5 kts
alt		± 50 ft
Hdg		± 10°

	PVT
	1.2 Vs1 ± 10 / - 5 kts
	± 100 ft
	± 10°

Bank ∠ not + 30° - ST/LVL + 10° - 10 not + 20° in climb/descent + 10° - 10 - rolls out on Hdg ± 10° back and climbs/descents ± 100ft

PTS

LESSON POWER-ON-STALLS STUDENT DATE

OBJECTIVE

★ TO DEVELOP ONE'S ABILITY TO RECOGNIZE AND RECOVER FORM STALLS IN VARIOUS CONFIGURATIONS. ALSO, TO DEVELOP ONE'S AWARENESS OF IMMINENT & FULL STALL RECOGNITION. ONE SHOULD ALSO BE AWARE OF THE AERODYNAMIC FACTORS INVOLVED IN A STALL.

ELEMENTS

★ CONTROL OF THE AIRPLANE BY USE OF RUDDER, AILERONS, PITCH, & POWER
- PROPER USE OF CONTROLS
- RECOGNITION OF WING BUFFET AND STALL WARNING HORN
- RECOGNITION OF FULL AND IMMINENT
- RECOVERY PROCEDURE

SCHEDULE

★
PREFLIGHT GROUND	:15
TAKE OFF & DEPARTURE STALLS	:15
ACCELERATED STALLS	:15
POST FLIGHT GROUND	:15
TOTAL TIME	1:00

INSTRUCTOR'S ACTIONS

★ ORAL DESCRIPTION OF ELEMENTS & COMMON ERRORS:

1. AERODYNAMICS OF POWER ON STALLS
2. RELATIONSHIP OF VARIOUS FACTORS SUCH AS LDG GEAR AND FLAP CONFIGURATION, WEIGHT, CENTER OF GRAVITY, LOAD FACTOR, AND BANK ANGLE TO STALL SPEED.
3. FLIGHT SITUATIONS WHERE UNINTENTIONAL POWER-ON-STALLS MAY OCCUR.
4. RECOGNITION OF THE FIRST INDICATIONS OF STALL
5. PERFORMANCE OF STALL IN CLIMBING FLIGHT (STRAIGHT OR TURNING)
6. ENTRY TECH. AND MIN. ALTITUDE
7. COORDINATION OF FLIGHT CONTROLS
8. RECOVERY TECH. AND MIN. RECOVERY ALTITUDE
9. INSTRUCTOR DEMO

STUDENTS'S ACTIONS

★ DISCUSS QUESTIONS, LISTEN, TAKE NOTES

COMPLETION STANDARDS

★ ONE SHOULD DEMONSTRATE THROUGH ORAL DISCUSSION AND ACTUAL PERFORMANCE THE ABILITY TO SET UP FOR A STALL, STALLING, AND RECOVER FROM A STALL

MAINTAINS AT LEAST 1500' AGL
HD +/- 10° A/S +/- 10 kts
BA +/- 10°
PRIVATE: +/- 20° BA

COMMON ERRORS

★ INADEQUATE OR LATE STALL RECOGNITION POOR: COORDINATION, HDG CONTROL, AND TIMING EXCESSIVE A/S & ALT LOSS ON RECOVERY

3. What are the steps involved in performing a power-on stall?

a. Perform clearing turns.

b. Establish the heading and altitude (recovery by 1,500 feet AGL).

c. Establish the takeoff or departure configuration.

d. Slow the airplane to normal liftoff airspeed.

e. Apply takeoff power for a takeoff stall or the recommended climb power for a departure stall.

f. Establish a climb attitude.

g. After the climb attitude is established, the nose should be brought smoothly upward to an attitude obviously impossible for the airplane to maintain and held at that attitude until a full stall occurs.

h. Recovery should be accomplished by immediately reducing the pitch attitude/angle of attack, applying maximum power (not necessary in a takeoff stall) and maintaining directional control through coordinated use of controls.

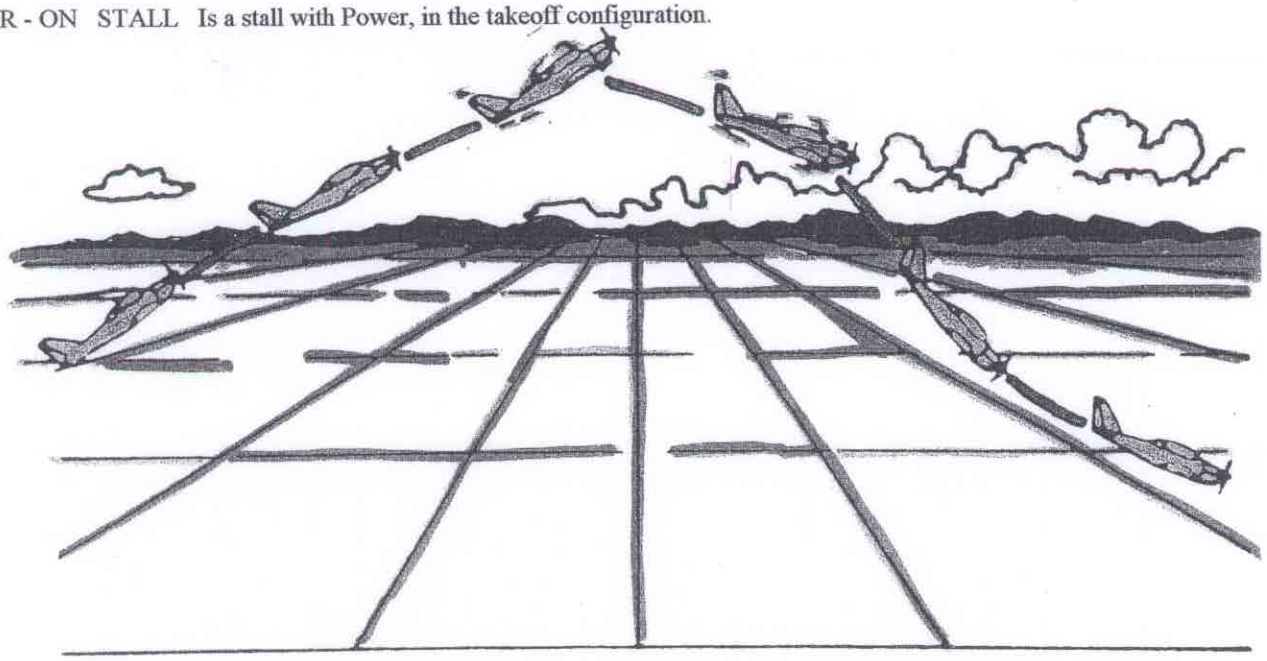
i. Control any yawing tendency with rudder.

j. Utilize ailerons to level wings as soon as possible.

k. As airspeed approaches V_X establish climb attitude to maintain V_X and to establish a positive rate climb.

l. Return to cruise flight.

POWER - ON STALL Is a stall with Power, in the takeoff configuration.



Why: To develop the ability to recognize and recover from stall in various configurations, and to develop the students awareness of Imminent and Full Stall Recognition.

How:

1. Point:
   Not in a congested area,
   Emergency landing area available.

2. Altitude:
   3,000' AGL and completed no lower than 1500' AGL.

3. Set Up:
   Clearing Turns, ~~A-GUMPS~~, Preman V
   Speed (Vr). 70 mph

4. Stall Entry:
   ~~Carb Heat (ON)~~
   Power (~~1500 RPM~~) 15" - mp
   below 150 → Gear & Flaps (UP)
   Don't Airspeed (Rotation Speed) 70mph

5. Approaching Stall:
   Power (Full Power)
   ~~Carb. Heat "OFF"~~
   SLOWLY Pitch Nose Up

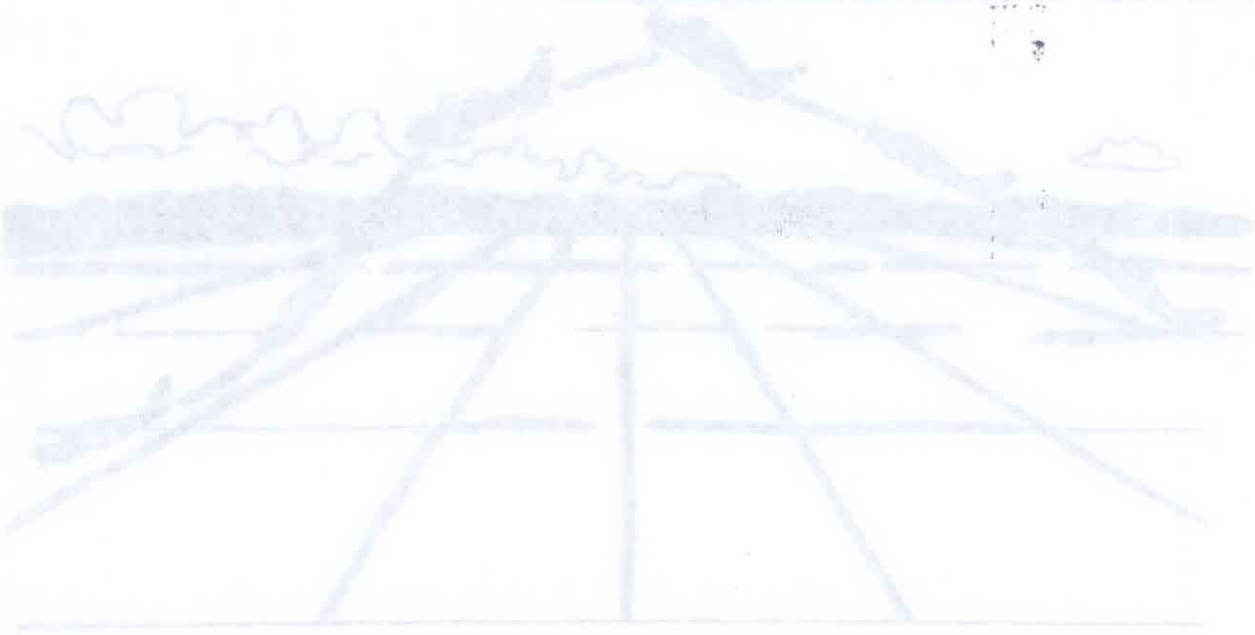
6. Recognize & Announce Stall symptoms:
   Airspeed and Noise Level "Decrease"
   "Mushy" feeling of Flight Controls.
   Stall Waning Horn.
   Stall Buffet.
   Attitude Nose High.

7. Recovery: Just
   Lower Nose – Below Horizon
   Wings Level
   Apply Full Power

8. Commercial Students:
   Climb at Vx or Vy as Appropriate
   Slowly Retract Flaps then Gear

9. Private Students:
   Retract Flaps Slowly as A/S reaches Vy.
   Gear "UP"
   Level Off.
   Accelerate to Cruise Speed.

PTS
entry no less 1500 ft agl
Heading ± 10°
Bank not more than 20° Bank ±10° in turning flight



LESSON POWER-OFF-STALLS STUDENT DATE

OBJECTIVE

★ TO DEVELOP ONE'S ABILITY TO RECOGNIZE AND RECOVER FORM STALLS IN VARIOUS CONFIGURATIONS. ALSO, TO DEVELOP ONE'S AWARENESS OF IMMINENT & FULL STALL RECOGNITION. ONE SHOULD ALSO BE AWARE OF THE AERODYNAMIC FACTORS INVOLVED IN A STALL.

ELEMENTS

★ CONTROL OF THE AIRPLANE BY USE OF RUDDER, AILERONS, PITCH, & POWER
- PROPER USE OF CONTROLS
- RECOGNITION OF WING BUFFET AND STALL WARNING HORN
- RECOGNITION OF FULL AND IMMINENT
- RECOVERY PROCEDURE

SCHEDULE

★

PREFLIGHT GROUND	:15
APPROACH TO LDG STALLS	:15
POST FLIGHT GROUND	:15
TOTAL TIME	:45

INSTRUCTOR'S ACTIONS

★ ORAL DESCRIPTION OF ELEMENTS & COMMON ERRORS:

1. AERODYNAMICS OF POWER OFF STALLS
2. RELATIONSHIP OF VARIOUS FACTORS SUCH AS LDG GEAR AND FLAP CONFIGURATION, WEIGHT, CENTER OF GRAVITY, LOAD FACTOR, AND BANK ANGLE TO STALL SPEED.
3. FLIGHT SITUATIONS WHERE UNINTENTIONAL POWER-OFF-STALLS MAY OCCUR.
4. RECOGNITION OF THE FIRST INDICATIONS OF STALL
5. PERFORMANCE OF STALL IN DESCENDING FLIGHT (STRAIGHT OR TURNING)
6. ENTRY TECH. AND MIN. ALTITUDE
7. COORDINATION OF FLIGHT CONTROLS
8. RECOVERY TECH. AND MIN. RECOVERY ALTITUDE
9. INSTRUCTOR DEMO

STUDENTS'S ACTIONS

★ DISCUSS QUESTIONS, LISTEN, TAKE NOTES

COMPLETION STANDARDS

★ ONE SHOULD DEMONSTRATE THROUGH ORAL DISCUSSION AND ACTUAL PERFORMANCE THE ABILITY TO SET UP FOR A STALL, STALLING, AND RECOVER FROM A STALL

MAINTAINS AT LEAST 1500' AGL
HD +/- 10° A/S +/- 10 kts
BA +/- 10°
PRIVATE: +/- 20° BA

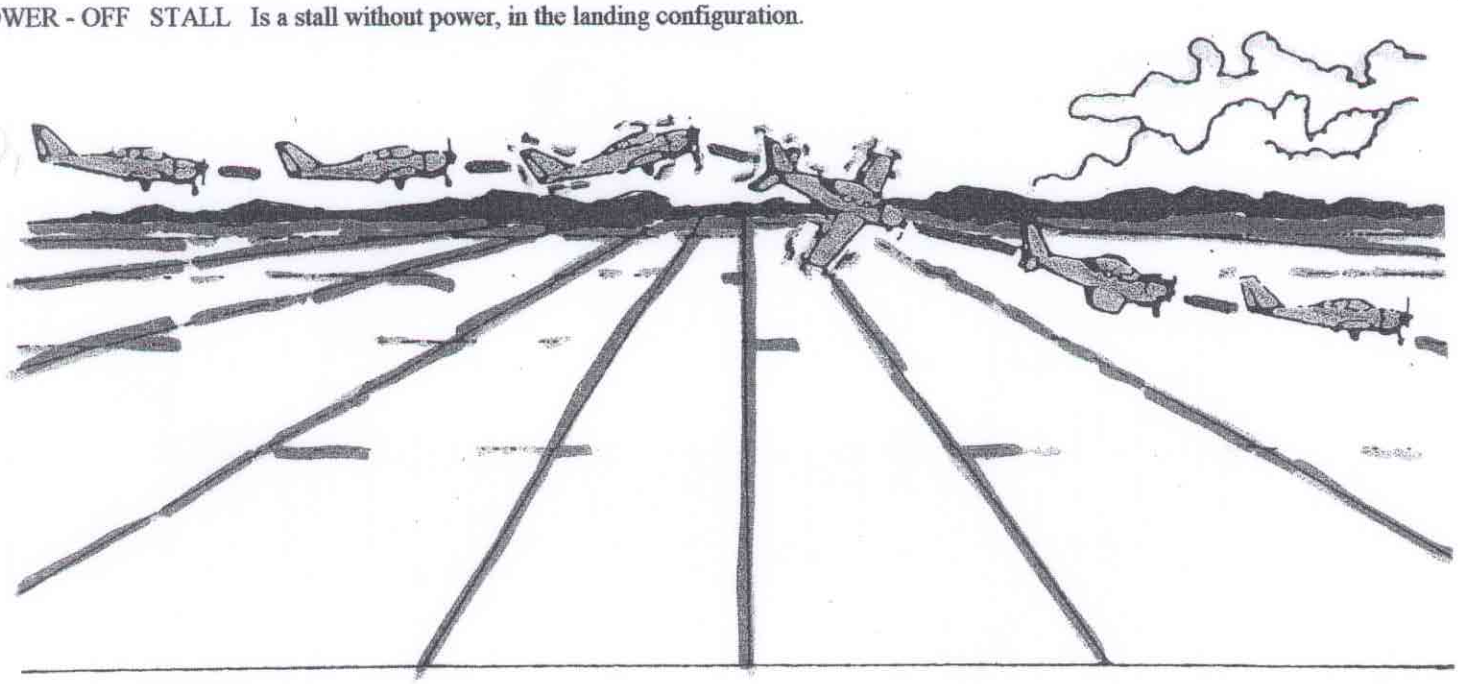
COMMON ERRORS

★ INADEQUATE OR LATE STALL RECOGNITION POOR: COORDINATION, HDG CONTROL, AND TIMING EXCESSIVE A/S & ALT LOSS ON RECOVERY

3. How is a power-off stall performed?

a. Perform clearing turns.
b. Establish heading and altitude (recovery by 1,500 feet AGL)
c. Extend landing gear (if applicable).
d. Carburetor heat ON.
e. Reduce power and maintain back pressure to slow aircraft to flap operating speed.
f. Extend approach flaps.
g. Reduce power to idle and establish approach airspeed.
h. Bring the nose smoothly upward until the full stall occurs
i. Immediately reduce angle of attack to regain flying speed.
j. Simultaneously apply full power (carburetor heat off).
k. Retract flaps incrementally.
l. Control any yawing tendency with rudder
m. Utilize ailerons to level wings as soon as possible.
n. As airspeed approaches V_X establish climb attitude to maintain V_X and to establish a positive rate climb.
o. Return to cruise flight.

POWER - OFF STALL Is a stall without power, in the landing configuration.



Why: To develop the ability to recognize and recover from stalls in various configurations, and to develop the students awareness of imminent and full stall recognition.

~~How~~ to do it:

1. Point:
   Not in a congested area,
   Emergency landing area available.

2. Altitude:
   3,000' AGL and completed no lower than 1500' AGL.

3. Set Up:
   Clearing Turns, ~~A-GUMPS~~, pre maneuver ✓ list
   Speed (Final Approach Speed) 85mph

4. Stall Entry:
   ~~Carb Heat (ON)~~
   Power (~~1500 RPM~~) below 150
   Gear & Flaps (Down)
   Airspeed (Approach Speed) 85mph

5. Approaching Stall:
   Power (Idle) VSI 500' ↓
   SLOWLY Pitch Nose Up

6. Recognize & Announce Stall symptoms:
   Airspeed and Noise Level "Decrease"
   "Mushy" feeling of Flight Controls.
   Stall Waning Horn.
   Stall Buffet.
   Attitude Nose High.

7. Recovery:
   Lower Nose
   Wings Level
   Apply Full Power
   ~~Carb Heat "OFF"~~

8. Commercial Students:
   Accelerate to Approach Speed.

9. Private Students:
   Retract Flaps Slowly as A/S reaches Vy.
   Gear "UP"
   Level Off.
   Accelerate to Cruise Speed.

PTS
Heading ±10°
Bank +0° / -10° in Turning flight
(no more than 30° Bank)

ESSON ELEVATOR TRIM STALL **STUDENT** **DATE**

ECTIVE

- ★ TO SHOW ONE THE IMPORTANCE OF MAKING SMOOTH POWER APPLICATIONS, OVERCOMING STRONG TRIM FORCES AND MAINTAINING POSITIVE CONTROL OF THE AIRPLANE TO HOLD SAFE FLIGHT ATTITUDES, AND USING PROPER AND TIMELY TRIM TECHNIQUES.
- ★ USUALLY OCCURS DURING A GO-AROUND OR A SIMULATED FORCED LANDING APPROACH, OR IMMEDIATELY AFTER TAKEOFF.

LEMENTS

- ★ CONTROL OF THE AIRPLANE BY USE OF RUDDER, AILERON, PITCH & POWER
  - * PROPER USE OF CONTROLS
  - * RECOGNITION OF WING BUFFET & STALL HORN
  - * RECOGNITION OF FULL & IMMINENT STALL
  - * RECOVERY PROCEDURES

NSTRUCTOR'S CTIONS

- ★ ORAL DESCRIPTION OF ELEMENTS & COMMON ERRORS:
  1. AERODYNAMICS OF ELEVATOR TRIM STALLS
  2. HAZARDS OF INADEQUATE CONTROL PRESSURES TO COMPENSATE FOR THRUST, TORQUE, AND UP-ELEVATOR TRIM DURING GO-AROUNDS AND OTHER RELATED MANEUVERS.
  3. ENTRY TECHNIQUE AND MINIMUM ENTRY ALTITUDE
  4. RECOGNITION OF ELEVATOR TRIM STALLS
  5. IMPORTANCE OF RECOVERING FROM AN ELEVATOR TRIM STALL IMMEDIATELY UPON RECOGNITION
  6. FLIGHT SITUATIONS WHERE ELEVATOR TRIM STALLS OCCUR
  7. RECOVERY TECHNIQUE AND MINIMUM RECOVERY ALTITUDE
  8. INSTRUCTOR DEMO

TUDENTS'S CTIONS

- ★ LISTEN, ASK QUESTIONS, AND TAKE NOTES

OMPLETION TANDARDS

- ★ ONE SHOULD DEMONSTRATE THROUGH ORAL DISCUSSION AND PERFORMANCE THE ABILITY TO SET UP FOR, STALL, AND RECOVER FROM STALL ALSO, SHOW KNOWLEDGE OF A IMMINENT STALL

MMON RORS

- ★ FAILURE TO ESTABLISH THE THRUST, TORQUE, AND UP ELEVATOR TRIM CONDITIONS; INADEQUATE RECOGNITION OF AND RECOVERY FROM STALL; NOT ALLOWING THE PITCH ATT TO INCREASE ABOVE THE NORMAL CLIMBING ATT; REDUCING POWER DURING RECOVERY; NOT MAINTAINING CONTROL OF AIRCRAFT WHILE RE-TRIMMING AND RETRACTING FLAPS

How is an elevator trim stall demonstrated?

a. Establish a minimum safe altitude (recovery by 1,500 feet AGL).

b. Perform clearing turns.

c. Slowly retard the throttle and extend landing gear if retractable.

d. Extend one-half to full flaps.

e. Close throttle.

f. Maintain altitude until airspeed approaches normal glide speed.

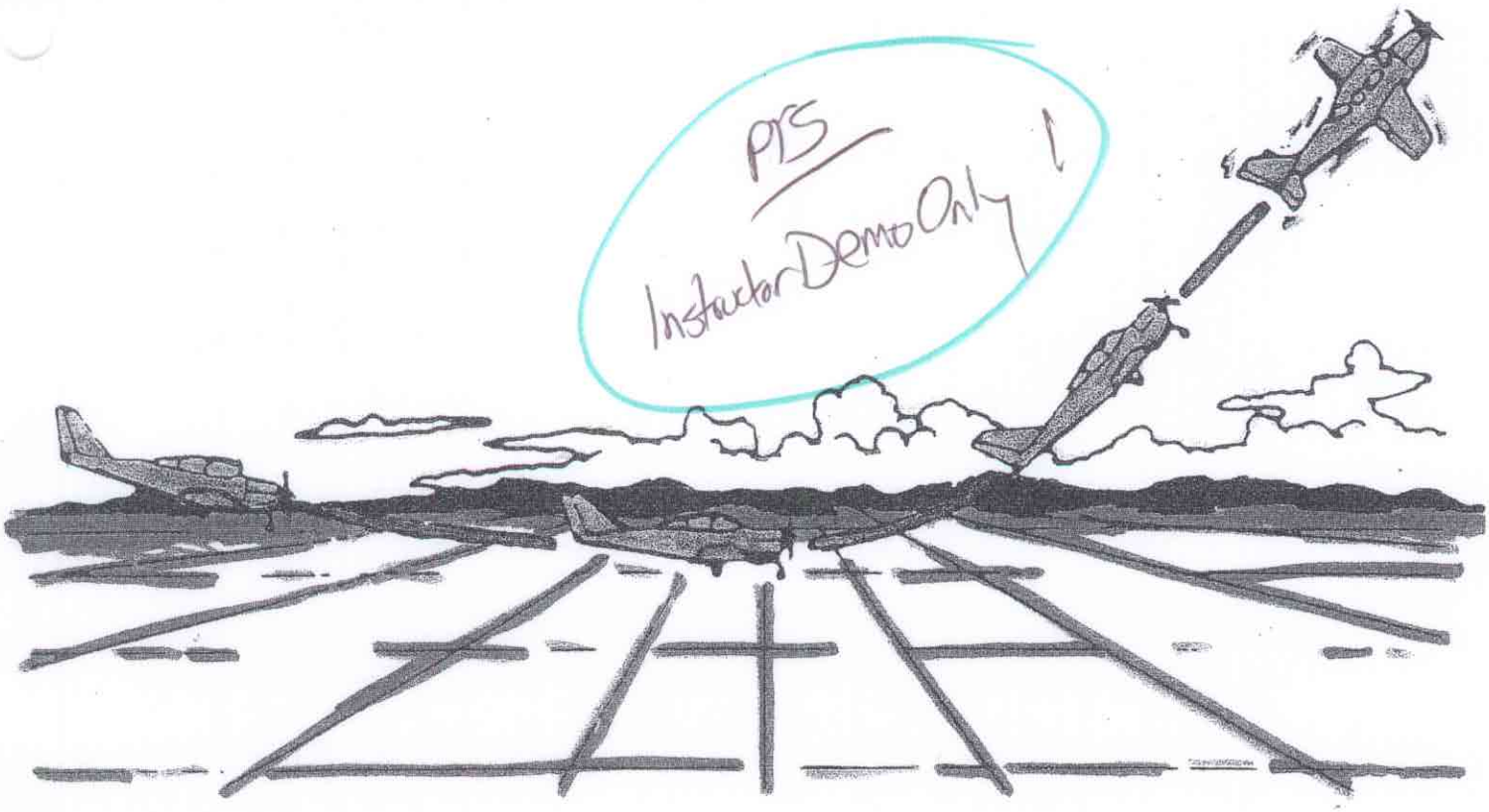
g. When normal glide is established, the airplane should be retrimmed just as would be done during a normal landing approach.

h. Advance throttle to maximum power as in a go-around procedure. The combined forces of thrust, torque, and back elevator trim will tend to make the nose rise sharply and turn to the left. To demonstrate what could occur if positive control of the airplane were not maintained, no immediate attempt should be made to correct these forces.

i. When a stall is imminent, forward pressure must be applied to return the airplane to normal climbing attitude.

j. Trim should then be adjusted to relieve the heavy control pressures and the normal go-around and level-off procedures should be completed.

ELEVATOR TRIM STALL Demonstrates what can happen when Full Power is Applied for a GO-AROUND while Not maintaining Positive Control of the A/C.



Why: To show the importance of making smooth power applications, overcoming strong trim forces and maintaining Positive control of the A/C to hold safe flight attitudes and using proper and timely trim techniques.

How to do it:

1. Point:
   Not in a congested area,
   Emergency landing area available.

2. Altitude:
   3,000' AGL and completed no lower than 1500' AGL.

3. Set Up:
   Clearing Turns, A-GUMPS,
   Extend Flaps ½ to Full,
   Gear Down.

4. Stall Entry:
   ~~Carb. Heat (ON)~~
   Power (IDLE)
   Establish ~~Best~~ Glide Speed 85mph
   Trim - For normal approach

5. Approaching Stall:
   Smoothly apply Full Power
   ~~Carb. Heat (OFF)~~

6. Recognize & Announce Stall symptoms:
   Airspeed and Noise Level "Decrease"
   "Mushy" feeling of Flight Controls.
   Stall Warning Horn.
   Stall Buffet.
   Attitude Nose High.

7. Recovery:
   Lower Nose to the Horizon
   Adjust Trim
   Wings Level
   Climb at Vy
   Retract Flaps 10° at a time
   Retract Gear

8. Resume Normal:
   Flight Attitude
   Power Setting
   Airspeed
   With Min. Loss of Altitude.

SECONDARY & CROSS CONTROL

LESSON STALL's **STUDENT** **DATE**

OBJECTIVE

★ To develop the one's ability to recognize and recover from Secondary and Cross control stalls

ELEMENTS

★ Control of the airplane by use of:

1. RUDDER
2. AILERON
3. PITCH
4. POWER

- Proper use of controls
- Recognition of wing buffet & stall horn
- Recognition of secondary stall, full, and imminent
- Recovery procedures of both

SCHEDULE

★

Pre-flight discussion	:20
Instructor demo	:20
Student demo	:25
Post flight	:15
total	1:20

INSTRUCTOR'S ACTIONS

★ Discuss lesson objectives
Demonstrate both stalls and recoveries.

STUDENTS'S ACTIONS

★ Demonstrate and recover from both stalls
Ask questions

COMPLETION STANDARDS

★ The student should demonstrate through oral discussion and actual performance the ability to set up for each stall and stall the aircraft and recovery from a stalled configuration and should knowledge of a imminent stall for both.

COMMON ERRORS

★ Inadequate or late stall recognition
★ Poor - coordination, HDG control, timing
★ Excessive airspeed and altitude loss on recovery

Secondary Stalls

1. What is a secondary stall?

This stall is called a secondary stall since it may occur after a recovery from a preceding primary stall. It is caused by attempting to hasten the completion of a stall recovery before the airplane has regained sufficient flying speed.

2. What should the pilot be aware of regarding secondary stalls?

This stall usually occurs when the pilot becomes too anxious in returning to straight and level flight after a stall or spin recovery. Knowledge and proficiency in this maneuver will assist a pilot in avoiding secondary stalls.

3. How should a flight instructor demonstrate a secondary stall?

Secondary stalls can be demonstrated during the recovery phase of any of the basic stalls. The secondary stall can be induced by simply pulling the nose up more rapidly than necessary during the recovery from a full stall.

4. What are some common errors associated with secondary stalls? (FAA-S-8081-6AS)

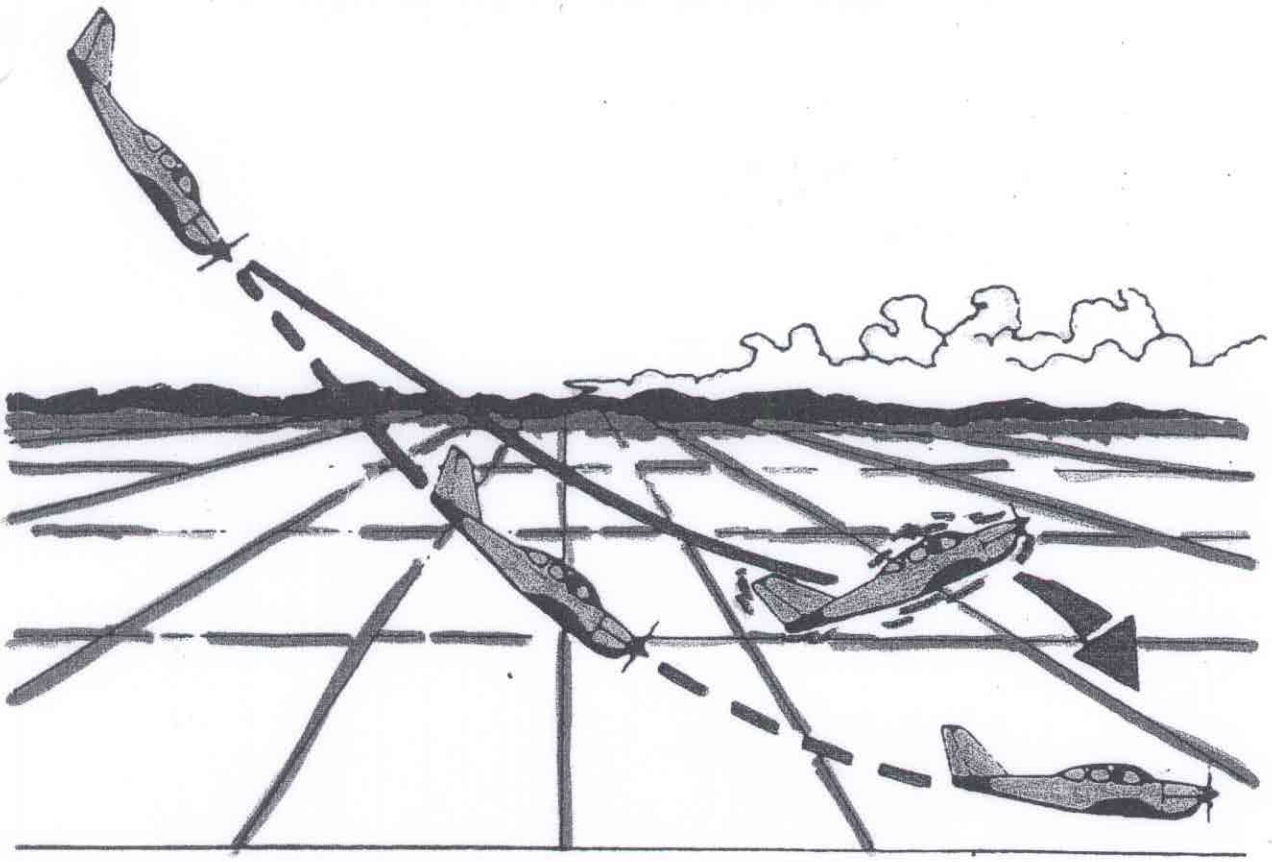
a. Failure to establish selected configuration prior to entry.

b. Improper or inadequate demonstration of the recognition of and recovery from a secondary stall.

c. Failure to establish a condition that will cause a secondary stall. Not applying sufficient back pressure to induce a secondary stall.

d. Failure to present simulated student instruction that adequately emphasizes the hazards of poor technique in recovering from a primary stall. Not explaining the "what, why, and how" of secondary stalls adequately.

SECONDARY STALL Is a stall that may occur after a recovery from a preceding primary stall. It Demonstrates what happens when stall recovery is attempted before the A/C has regained sufficient airspeed.



Why: To Recognize the stall, and to recover from it with a minimum loss of altitude.

How to do it:

1. Point:
   Not in a congested area,
   Emergency landing area available.

2. Altitude:
   3,000' AGL and completed no lower than 1500' AGL.

3. Set Up:
   Clearing Turns, A-GUMPS.

4. Entry:
   Stall the A/C
   At Full Stall, Release Back Pressure.

5. Approaching Stall:
   Pitch Nose Up before Airspeed is Regained.
   Stall for the Second Time

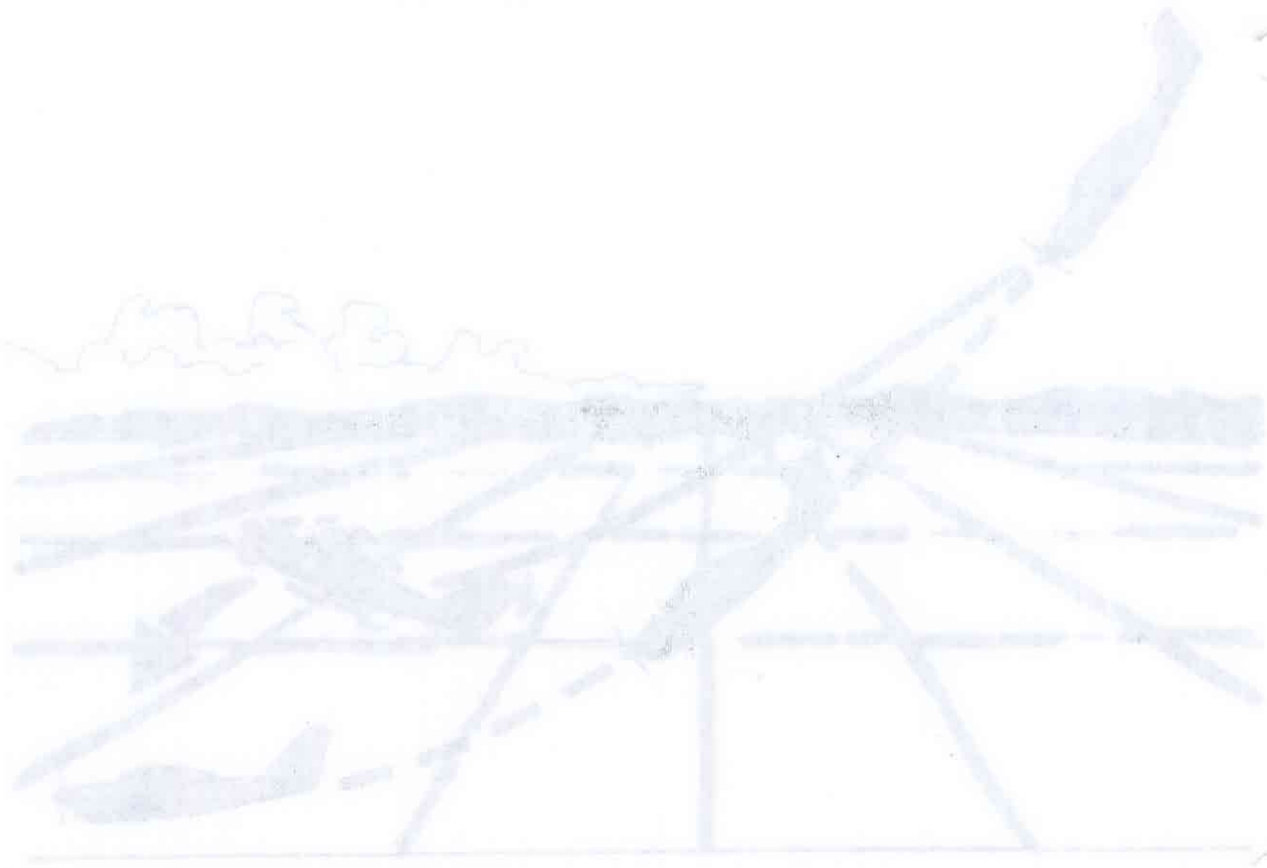
6. Recovery:
   Lower Nose to the Horizon
   Add Full Power
   Wings Level
   Allow airspeed to build up
   Return to Straight-and-level flight

7. Resume Normal:
   Flight Attitude
   Power Setting
   Airspeed
   With Min. Loss of Attitude

8. Practice After:
   Power - On Stalls
   Power - Off Stalls

PTS

instructor demo only!



SECONDARY & CROSS CONTROL

LESSON STALL's **STUDENT** **DATE**

OBJECTIVE

★ To develop the one's ability to recognize and recover from Secondary and Cross control stalls

ELEMENTS

★ Control of the airplane by use of:

1. RUDDER
2. AILERON
3. PITCH
4. POWER

- Proper use of controls
- Recognition of wing buffet & stall horn
- Recognition of secondary stall, full, and imminent
- Recovery procedures of both

SCHEDULE

★

Pre-flight discussion	:20
Instructor demo	:20
Student demo	:25
Post flight	:15
total	1:20

INSTRUCTOR'S ACTIONS

★ Discuss lesson objectives
Demonstrate both stalls
and recoveries.

STUDENT'S ACTIONS

★ Demonstrate and recover from both stalls
Ask questions

COMPLETION STANDARDS

★ The student should demonstrate through oral discussion and actual performance the ability to set up for each stall and stall the aircraft and recovery from a stalled configuration and should knowledge of a imminent stall for both.

COMMON ERRORS

★ Inadequate or late stall recognition
★ Poor - coordination, HDG control, timing
★ Excessive airspeed and altitude loss on recovery

Crossed-Control Stalls

1. What happens in a crossed-control stall?

A crossed-control stall occurs when the pilot allows the aircraft to be flown in uncoordinated flight with the flight controls crossed—that is, aileron pressure applied in one direction and rudder pressure in the opposite direction. If excessive back pressure is applied, a crossed-control stall may result.

2. Explain why the flight instructor should demonstrate the crossed-control stall to the student.

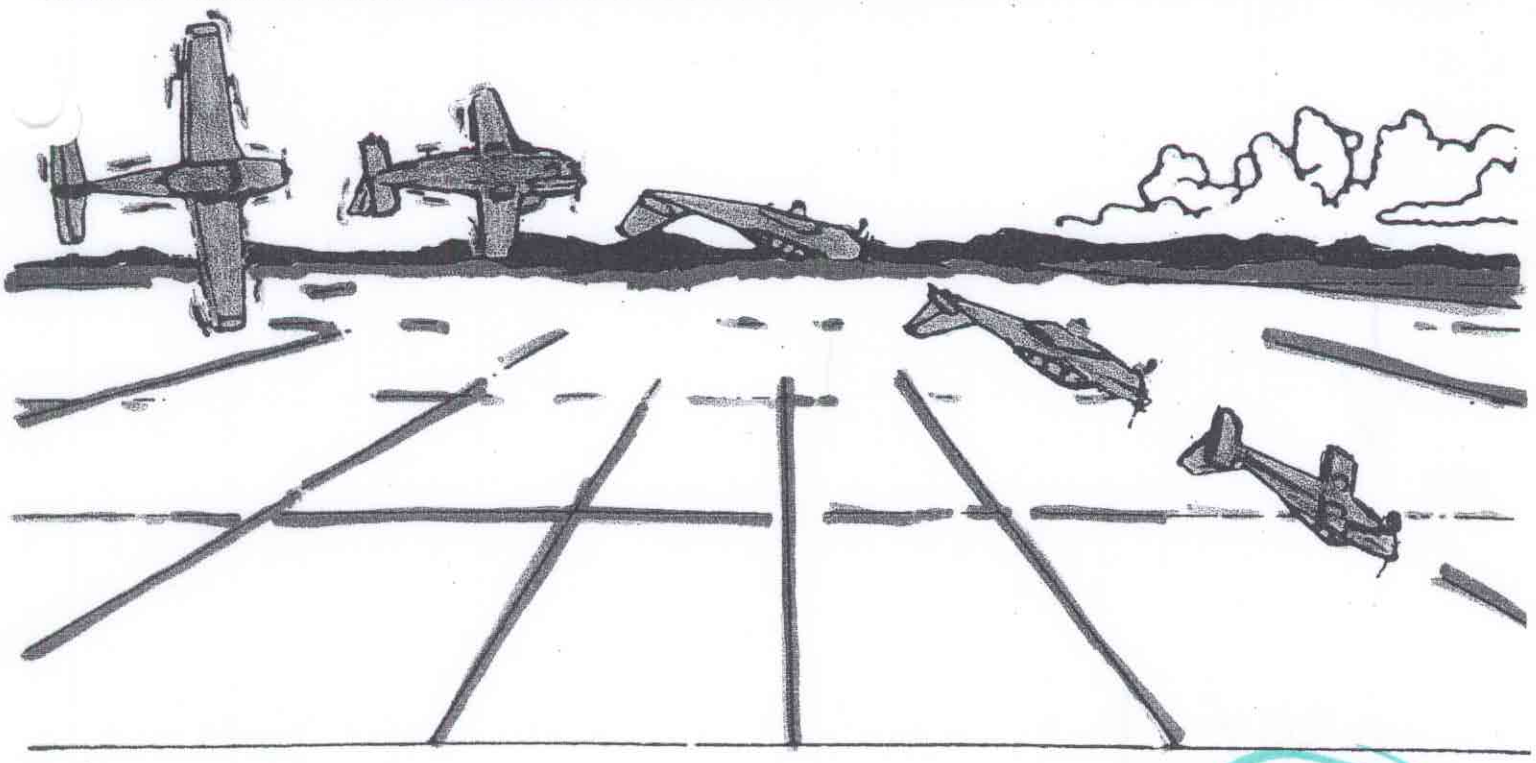
The objective of this demonstration maneuver is to show the effect of improper control technique and to emphasize the importance of using coordinated control pressures whenever making turns. This type of stall is most likely to occur during a poorly planned and executed base to final approach turn and often is the result of overshooting the centerline of the runway during that turn.

3. How is the crossed-control stall demonstrated?

a. Perform clearing turns.
b. Establish heading and altitude (recovery by 1,500 feet AGL).
c. Perform a checklist (GUMPS).
d. Reduce power.
e. Maintain altitude until airspeed approaches normal glide speed.
f. Retrim aircraft.
g. Roll into a medium-banked turn.
h. During turn excessive rudder pressure should be applied in direction of turn but the bank held constant by applying opposite aileron pressure.
i. Increase back elevator pressure to keep nose from lowering.
j. Control pressures should be increased until airplane stalls.
k. When stall occurs, recover by releasing control pressures and increasing power as necessary.
l. Control any yawing tendency with rudder.
m. Utilize ailerons to level wings as soon as possible.
n. As airspeed approaches V_X establish climb attitude to maintain V_X and to establish a positive rate climb.
o. Return to cruise flight.

Rate of TURN IS TOO STEEP for The Angle of BANK.

CROSSED CONTROL STALL Demonstrates the effect of improper control techniques that can occur while turning base to final.



PTS
Instructor
Demo
only

Why: To emphasize the importance of using coordinated control pressures when making turns.

How to do it:

1. Point:
   Not in a congested area,
   Emergency landing area available.

2. Altitude:
   3,000' AGL and completed no lower than 1500' AGL.

3. Set Up:
   Clearing Turns, ~~A-GUMPS~~,
   Gear Down, No Flaps, Trim.

Pre maneuver ✓ LISL
Amps, Prop, mixture, Lights

4. Remember:
   Stall might break Toward or Away from Turn, or
   Snap into a Spin.

5. Stall Entry:
   ~~Carb. Heat (ON)~~
   Power (IDLE)
   Establish ~~Best~~ Glide Speed 85 mph
   Trim
   Roll into Medium-Banked Turn

6. Approaching Stall:
   Apply Excessive Rudder in the direction of Turn
   Apply Opposite Aileron Pressure
   Pitch Nose Up
   Full Stall

7. Recovery:
   Release the Control Pressures
   Add Full Power
   ~~Carb. Heat (OFF)~~
   Wings Level

8. Resume Normal:
   Flight Attitude
   Power Setting
   Airspeed
   With Min. Loss of Altitude

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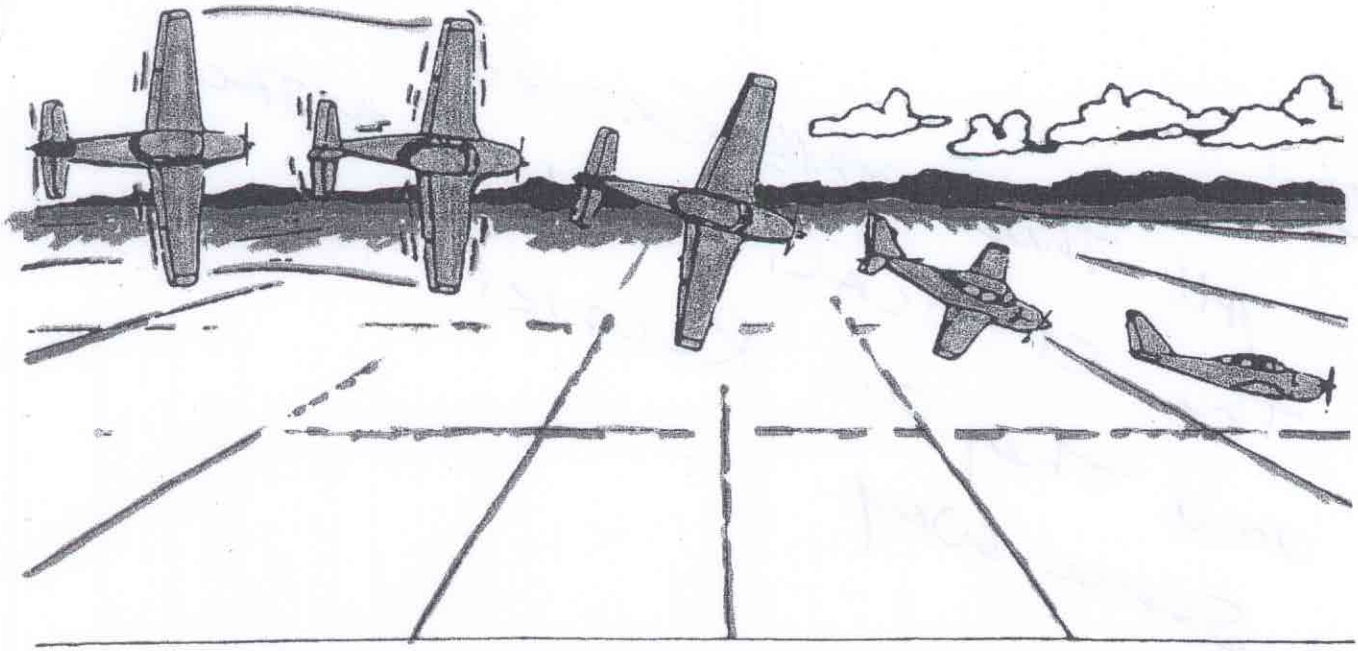
ACCELERATED "HIGH SPEED" STALL Is a stall at a Higher Indicated A/S when Excessive Maneuvering Loads are Imposed by Steep Turns, Pull up's, or other Abrupt Changes in the aircrafts flight path.



Why: To develop the ability to recognize immediately, and take prompt, effective recovery action at the first indication of a stall because complete loss of flight control plus a Power-On spin can result if stall is aloud to continue.

How to do it:

1. Point:
   Not in a congested area,
   Emergency landing area available.

2. Altitude:
   3,000' AGL and completed no lower than 1500' AGL.

3. Set Up:
   Clearing Turns, Speed (Va), A-GUMPS

4. Remember:
   Never practice stall with Flaps
   Do Not Exceed Load Limits of the A/C
   Don't Exceed Cruise Speed During Recovery.
   A/C Needs to be Certificated in the Aerobatic Category

5. Stall Entry:
   Carb. Heat (ON)
   Reduce Power and Increase Back Pressure
   Speed (Va) or within 20 kts above unaccelerated stall speed.
   Being 45° banked level turn.

Approaching Stall:
   Keep Reducing Power and Applying Back Pressure until imminent stall occur
   Note - Stall should occur within 90° of Turn
   Note - Airspeed when stall occur

7. Stall Recovery:
   Release Back Pressure
   Increase Power
   Simultaneously :
   - Roll Wings Level
   - Lower Nose
   Increase Power
   Carb. Heat (OFF)

PTS

Demo Only
not in PTS

don

All three stalls exceed
the critical angle of attack
and they all Recover the
same way.

LESSON STALL / SPIN AWARENESS **STUDENT** _____ **DATE** _____

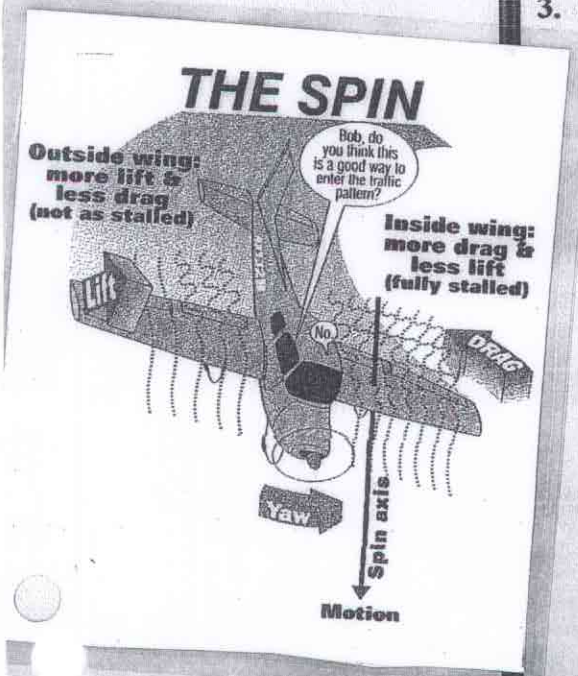
OBJECTIVE

To Develop the student's ability to instinctively recognize and recover from Stalls / Spins, and develop their knowledge of how and when they are likely to occur.

ELEMENTS

1. **INTRO:**
   a. Most Accidents Occur Close to the Ground

2. **STALLS:**
   a. **Definition:**
   b. **Recognition:**
      1. Sight
      2. Sound
      3. Feel
      4. Kinesthesia (senses)
      5. Flight Instruments
   c. **Types:**
      1. Power -Off (Approach to Landing Stalls)
      2. Power -On (Departure Stalls)
      3. Accelerated
   d. **Recovery:**
      1. Lower Nose
      2. Full Power
      3. Level Wings
   e. **Secondary Stalls:**
      1. Pilot becomes too Anxious

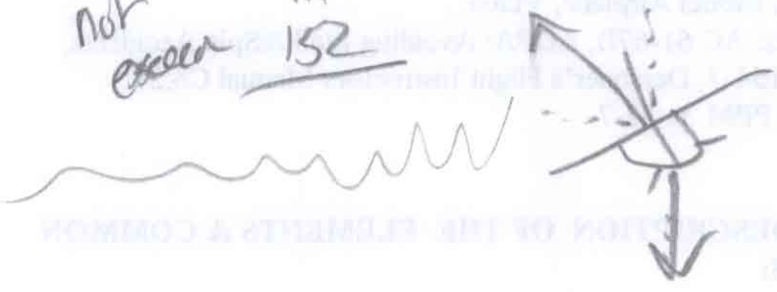


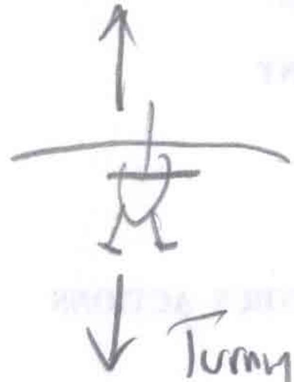
3. **SPINS:**
   a. **Definition:**
   b. **Weight & Balance:**
      1. **Forward & Aft CG**
   c. **Causes:**
      1. **Aggravated Stall**
      2. **Slipping Turn (Cross Controls)**
         - Rotation in the direction of Rudder being applied
      3. **Skidding Turn (Same Direction)**
         - Rotation in the same direction of Controls
   d. **Types:**
      1. **Incipient Spin**
         - begins at the stall and ends when rotation starts
      2. **Fully Developed Spin**
         - occurs when he A/C angular rotation rates, airspeed, and vertical speed are stabilized from turn-to-turn in a flight-path that is close to vertical.
      3. **Flat Spin**
         - is characterized by a near level pitch and roll attitude with the spin axis near the CG of the airplane.
   e. **Recovery:**
      1. **PARE**

SCHEDULE	Ground Lesson 1:00
EQUIPMENT	Handouts, Model Airplane, Video References: AC 61-67B, AOPA: Avoiding Stall &Spin Accidents, FTH. P. 154-7, Dershner's Flight Instructors Manual Ch.21, Jeppesen: PPM p. 52-7.
INSTRUCTOR'S ACTIONS	**ORAL DESCRIPTION OF THE ELEMENTS & COMMON ERRORS:** **1. Aerodynamics of Spins.** **2. Airplanes Approved for the Spin Maneuver Based on Airworthiness Category and Type Certificate.** **3. Relationship of Various Factors such as Configuration, Weight, Center of Gravity, and Control Coordination to Spins.** **4. Flight Situations where Unintentional Spins may Occur.** **5. How to Recognize and Recover from Imminent, Unintentional Spins.** **6. Entry Technique and Minimum Entry Altitude for Intentional Spins.** **7. Control Technique to Maintain a Stabilized Spin.** **8. Orientation During a Spin.** **9. Recovery Technique and Minimum Recovery Altitude for Intentional Spins.** **0. Anxiety Factors Associated with Spin Instruction.**
STUDENT'S ACTIONS	Lissen, Take Notes, and Ask Questions
COMPLETION STANDARDS	**The student Should Demonstrate Orally by Explaining What to do During Recovery, and an Awareness the Hazards of Stalls / Spins in order to prevent related accidents.**

75-80 kts

not exceed in 152





Turning forces.

Both wings Stalled

level

Stall and Spin

more

① VFR into IFR

1 wing Down other

② Base to Final

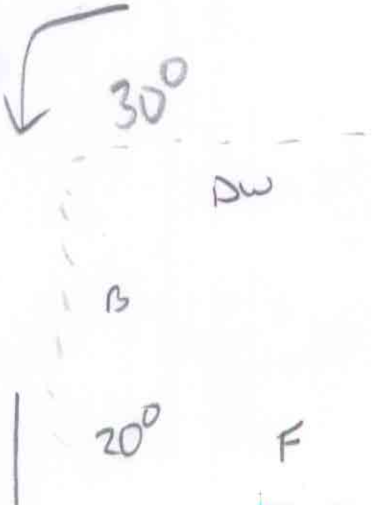
③ Power on Stalls
Aft CG

6 Spins

the entered

2 to rt.

1-4



5, 6. - yes

I recover all 6

Pilot - Think Slower

Summary: Aggravate stall, + rudder = autorotation
low wing drops - high wing whips around

SPINS Is an aggravated stall that results in what is termed "auto-rotation" wherein the A/C follows a corkscrew path in a downward direction.

Why: Enter, Maintain, and Recover from a spin, in order to Prevent them, and know the proper procedure for recovering from unintentional spins.

How to do it:

1. Point:
   Not in a congested area,
   Emergency landing area available.

2. Altitude:
   5,000' AGL and completed no lower than ~~1500~~ 3500' AGL.

3. Set Up:
   Clearing Turns, ~~A-GUMPS~~, pre maneuver
   Trim, Carb. Heat (ON).

4. Spin Entry:
   Power (IDLE)
   Apply Back Pressure
   Ailerons Neutral
   Full Rudder in direction of Spin
   Bring Yoke Fully Back
   Use outside references to maintain orientation

5. Spin:
   Power (IDLE)
   Ailerons Neutral
   Check spin Direction with
      Out-Side References
      Turn Coordinator
   Begin Recovery ¼ to ½ turn prior to desired recovery heading

6. Recovery:
   P - Power Idle
   A - Ailerons Neutral
   R - Rudder Full Opposite Direction of Rotation
   E - Elevator / Yoke Forward Pressure

   Hold control inputs until rotation Stops
   Neutralize rudder
   Wings Level
   Apply Back Pressure to Recovery from Steep Spiral
   Avoid Secondary Stall

   As the nose rises past the Horizon
   Add Power
   Carb. Heat (OFF)

7. Resume Normal:
   Flight Attitude
   Power Setting
   Airspeed
   With Min. Loss of Altitude

PTS
Describe
+
Teach +
Instruct in
recovery
Do not demo
unless approved

Skid = bad (Stall + Flip)
Slip - better - flip

Memorize what / why