LANDING THE AIRCRAFT – A HOW TO GUIDE

BEFORE ENTERING THE TRAFFIC PATTERN	DOWNWIND LEG – BEFORE RUNWAY NUMBERS
1.) Get airport information (ATIS or UNICOM) 2.) Make your initial communication – announce position and intent to land *and receive clearance if necessary* 3.) Perform descent checklist prior to initial descent 4.) Perform pre-landing checklist prior to 45° entry to traffic pattern 5.) Slow the aircraft down to V_A (maneuvering) speed 6.) Enter traffic pattern at proper altitude.	1.) Report your position (non-towered airport) 2.) Slow down to V_A (if already not there) by reducing power and maintain altitude. 3.) Fly parallel to runway and check for other traffic
DOWNWIND LEG – AFTER RUNWAY NUMBERS	**BASE LEG**
1.) Reduce power to 1700-1800 RPM's 2.) Carburetor Heat – ON 3.) Slow down aircraft till airspeed is within the "White Arc" on the airspeed indicator 4.) When airspeed is in the "White Arc" put in 10° of flaps 5.) Begin gradual descent (approx 500 ft. per minute) 6.) Continue to slow down aircraft and maintain 70 knots 7.) Begin turn to the base leg when runway is off of your shoulder at approx. 45°	1.) Report your position (non-towered airport) 2.) Control rate of descent with power, maintain 70 knots airspeed (continue descending) 3.) Fly perpendicular to the runway 4.) Put in 20° of flaps 5.) When close to the runway, start a gradual (15° bank) turn towards the approach end of the runway so that at the completion of the turn you will end up lined up with the runway 6.) Slow to 65 knots
FINAL LEG	**TOUCHDOWN**
1.) Report your position (non-towered airport) 2.) Fly towards the runway numbers 3.) Control rate of descent with power, maintain 65 knots airspeed 4.) Put in full flaps - 40° 5.) Descend along the glideslope and keep the runway numbers in the same place on the windshield 6.) Control "left-right" drift with the yoke 7.) Control the direction of the nose with the rudder pedals 8.) Fly towards the runway numbers along the centerline of the runway	1.) 30-50 ft. off of the ground - make sure you are looking at the far end of the runway 2.) 10 ft. off of the ground - level off by pitching back slightly 3.) When the far end of the runway "disappears" (3-5 ft. off of the ground) begin your flare and pull back and back on the yoke slowly 4.) Maintain "left-right" drift with yoke and the nose direction with rudders 5.) Touchdown with the back two wheels (one at a time if necessary) 6.) Slowly let the nose wheel touch down 7.) Tap lightly on the brakes and when slowed down to a safe speed, taxi off of the runway
AFTER LANDING	
1.) Stop after the exiting the runway at the "hold short" lines 2.) Report "clear of the active runway" (at non-towered airport) and your intentions 3.) Or receive taxi clearance from controlling authority (tower or ground control)	4.) Perform after landing checklist 5.) Taxi to: a. Parking b. Back to runway 6.) Repeat as needed

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LANDING THE AIRCRAFT – A HOW TO GUIDE

BEFORE ENTERING THE TRAFFIC PATTERN	DOWNWIND LEG – IMPROPER RUNWAY NUMBERS
1.) Get airport information (ATIS or UNICOM) 2.) Make your initial communication – announce position and intent to land and receive clearance if necessary 3.) Perform descent checklist prior to initial descent 4.) Perform pre-landing checklist prior to 45° entry to traffic pattern 5.) Slow the aircraft down to V_A (maneuvering) speed 6.) Enter traffic pattern at proper altitude.	1.) Report your position (non-towered airport) 2.) Slow down to V_A (if already not there) by reducing power and maintain altitude. 3.) Fly parallel to runway and check for other traffic
DOWNWIND LEG – AFTER RUNWAY NUMBERS	**BASE LEG**
1.) Reduce power to 1700-1800 RPM's 2.) Carburetor Heat – ON 3.) Slow down aircraft till airspeed is within the "White Arc" on the airspeed indicator 4.) When airspeed is in the "White Arc" put in 10° of flaps 5.) Begin gradual descent (approx 500 ft. per minute) 6.) Continue to slow down aircraft and maintain 70 knots 7.) Begin turn to the base leg when runway is off of your shoulder at approx. 45°	1.) Report your position (non-towered airport) 2.) Control rate of descent with power, maintain 70 knots airspeed (continue descending) 3.) Fly perpendicular to the runway 4.) Put in 20° of flaps 5.) When close to the runway, start a gradual (15° bank) turn towards the approach end of the runway so that at the completion of the turn you will end up lined up with the runway 6.) Slow to 65 knots
FINAL LEG	**TOUCHDOWN**
1.) Report your position (non-towered airport) 2.) Fly towards the runway numbers 3.) Control rate of descent with power, maintain 65 knots airspeed 4.) Put in full flaps - 40° 5.) Descend along the glideslope and keep the runway numbers in the same place on the windshield 6.) Control "left-right" drift with the yoke 7.) Control the direction of the nose with the rudder pedals 8.) Fly towards the runway numbers along the centerline of the runway	1.) 30-50 ft. off of the ground - make sure you are looking at the far end of the runway 2.) 10 ft. off of the ground - level off by pitching back slightly 3.) When the far end of the runway "disappears" (3-5 ft. off of the ground) begin your flare and pull back and back on the yoke slowly 4.) Maintain "left-right" drift with yoke and the nose direction with rudders 5.) Touchdown with the back two wheels (one at a time if necessary) 6.) Slowly let the nose wheel touch down 7.) Tap lightly on the brakes and when slowed down to a safe speed, taxi off of the runway
AFTER LANDING:	
1.) Stop after the exiting the runway at the "hold short" lines 2.) Report "clear of the active runway" (at non-towered airport) and your intentions 3.) Or receive taxi clearance from controlling authority (tower or ground control)	4.) Perform after landing checklist 5.) Taxi to: a. Parking b. Back to runway 6.) Repeat as needed

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Lesson: Normal Take-offs **Date:** 04-17-97

Objective:

- To develop the student's skill of handling the aircraft during a normal take-off.

Elements:

- New Terms:
  - ***Tracking*** V_X
  - V_Y V_{S1}
- Taxiing onto the runway
  - Lights, Camera, Action
  - C.A.R.E.
  - Heading indicator cross check
- Apply power smoothly
  - Engine gauges cross check
- Accelerate to rotation speed ($1.1 * V_{S1}$)
- Tracking the center line
  - Rudder inputs
- Apply back pressure
- Once airborne
  - Tap brakes
  - Accelerate to V_X or V_Y
  - Track the extended center line

Schedule:

To be done in conjunction with landings

- 0.5 hour preflight discussion
- 1.0 hour flight
- 0.3 hour postflight discussion

Equipment:

- Chalk Board or White Board
- Chalk or Dry-Erase Marker
- Small Model Airplane
- Airplane

Instructor's Actions:

- Demonstrate the techniques discussed
- Critique student's progress
- Offer advise

Student's Actions:

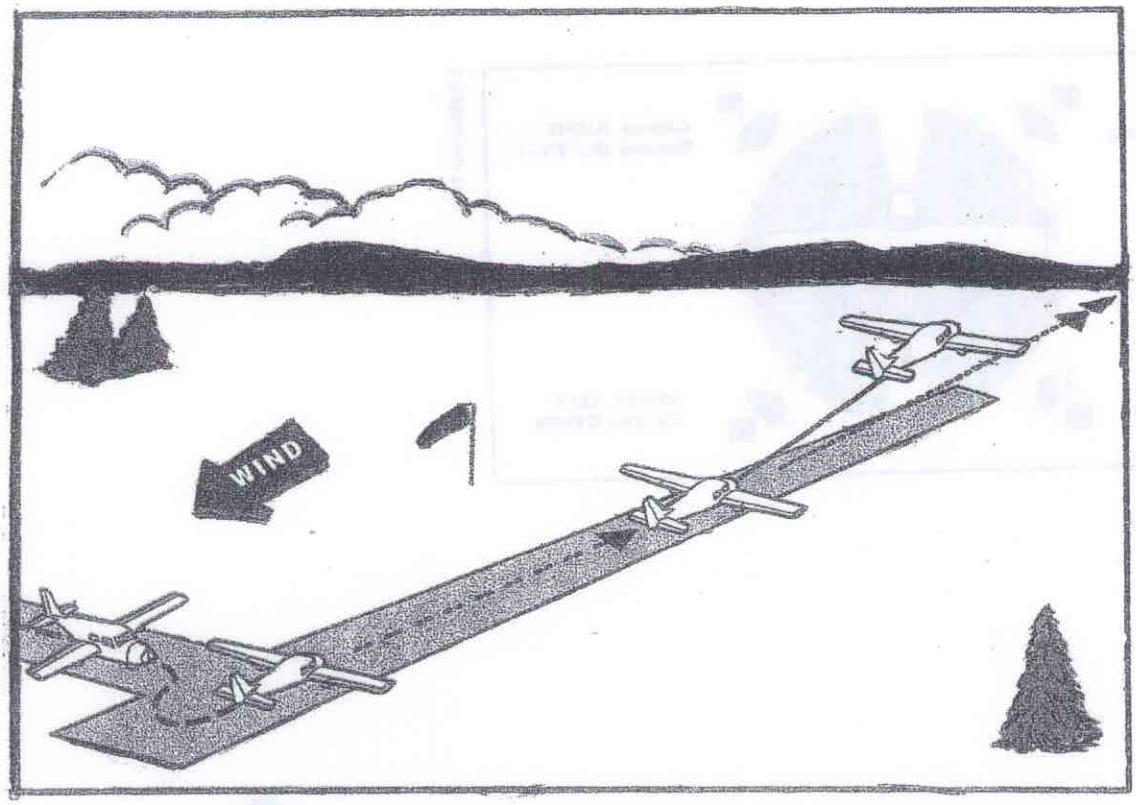
- Demonstrate the techniques discussed
- Ask Questions

Completion Standards:

- Transition from the take-off roll to the air smoothly
- Proper input of rudder correction
- Be able to take-off and track the runway center line

Common Errors:

- Abrupt yanking back on the yoke
- Not enough rudder input
- Excessively nose high pitch attitude
- Wandering off of center line



CLEAR FOR TRAFFIC!

NORMAL TAKEOFF Is one in which the A/C is Headed Directly into the Wind.

How to do it:

1. Prior to Takeoff:
   Use POH to determine T-O & LDG Performance and Limitations.

2. Wind:
   ATIS, Wind-Sock, Tetrahedron, Landing Tee, Segmented Circle.

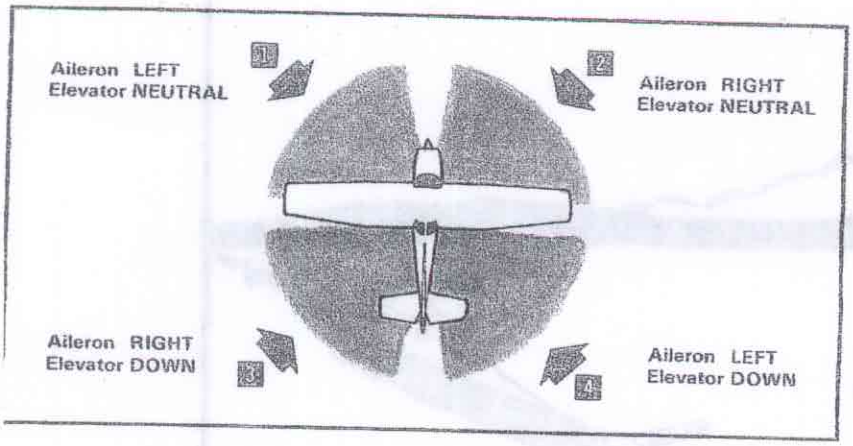
3. Flaps:
   Check POH to see if needed.

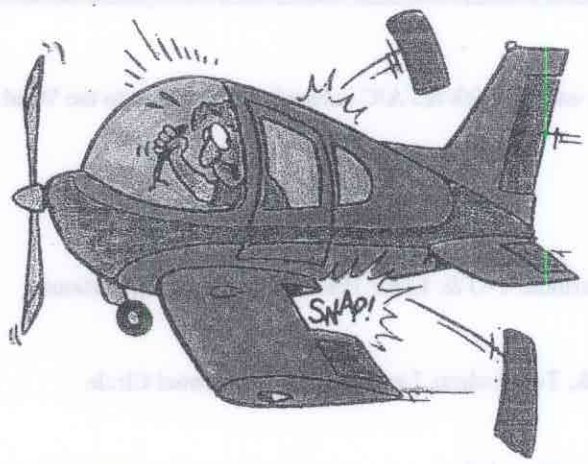
4. Taxi on Runway:
   Clear Area For Takeoff Hazards.
   C.A.R.E.
   Transition Heels to Floor.
   Apply Power Smoothly then Check Engine Gauges.
   Use Rudder to Stay Aline.
   A/S is Alive.

5. Lift - Off:
   Apply Back-Pressure and Rotate at Vr 70mph
   Climb at Vy and Aim for the Horizon. 100 mph
   Use Right Rudder to offset Torque Effect and to Stay Aline with Center Line.
   Keep one Hand on Throttle.
   Keep wings level with Ailerons and Trim if needed.

6. Climb - Out:
   Track Center Line with DG.
   Pattern Altitude Pumps Off
   Check Engine Gauges.
   Set A/S for Cruise Climb. 110 mph

PTS
Rotate @ recommended A/S
comm ± 5 kts or Vy
put +10 / -5 kts on climb





"OH! THAT'S WHAT THE WHITE ARC MEANS!!"

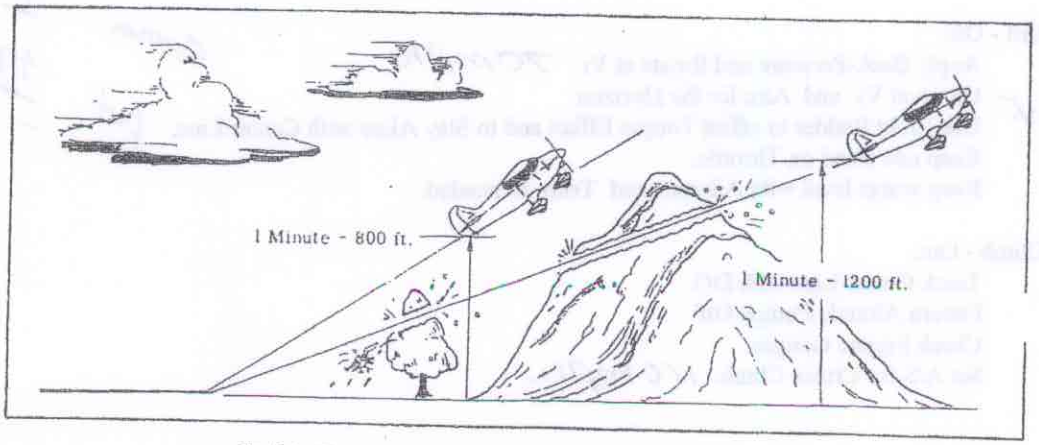


Fig. 5-9. Exaggerated comparison of max angle and best rate of climb.

Lesson: Normal Landings **Date:** 04-17-97

Objective:

- To develop the student's skill of handling the aircraft during a normal approach and landing.

Elements:

- New Terms:
  - ***Flare*** ***Roll Out***
  - ***Porpoise*** ***Power Curve***
  - ***V_{so}*** ***Float***
  - ***Overshoot*** ***Undershoot***
  - ***Go-Around (Balked Landing)***
- Abeam Landing Target
  - Reduce power
  - G.U.M.P.S.
  - First notch of flaps
- Turn to Base
  - ...when target is 45 degrees behind
  - Reduce Power
  - Second notch of flaps
  - G.U.M.P.S.
- Turn Final
  - ..to be on the extended centerline
  - Final notch of flaps
  - Final G.U.M.P.S.
- Flare
- Roll Out
  - After landing check list
- Go-Around (Balked Landing)
  - Increase power
  - Raise flaps
  - Gently transition to a climb

Schedule:

To be done in conjunction with take-offs

- 0.5 hour preflight discussion
- 1.0 hour flight
- 0.3 hour postflight discussion

Equipment:

- Chalk Board or White Board
- Chalk or Dry-Erase Marker
- Small Model Airplane

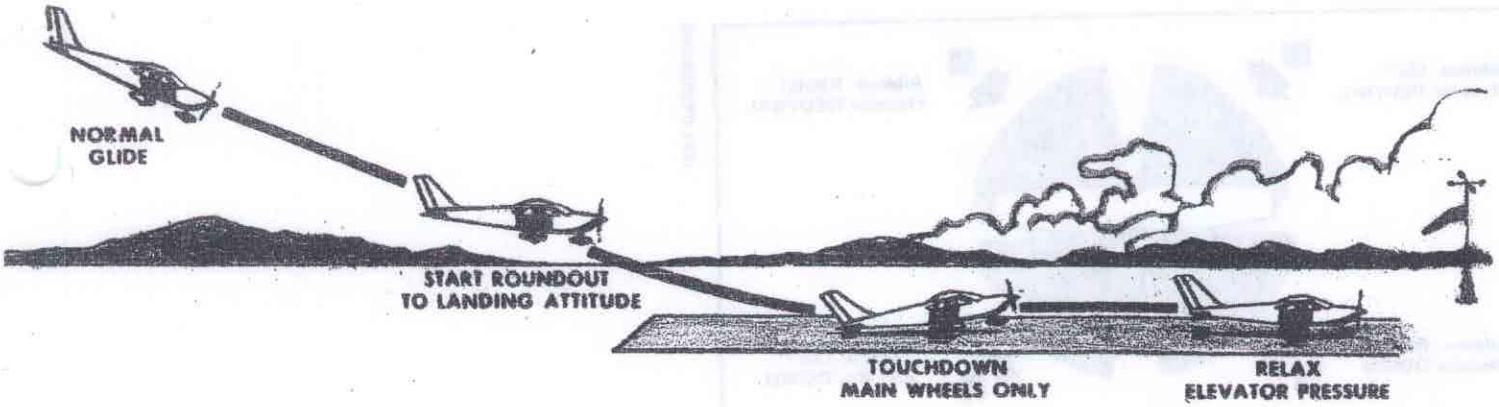
- Airplane

Instructor's Actions:
- Demonstrate the techniques discussed
- Critique student's progress
- Offer advise

Student's Actions:
- Demonstrate the techniques discussed
- Ask Questions

Completion Standards:
- The student must show good judgment, be able to safely land the aircraft and demonstrate a go-around.

Common Errors:
- Excessive Float
- Flaring too high
- Reduction of power too soon
- Not enough power loss
- Retracting the flaps before adding power on the go-around
- High on final approach
- Low on final approach



CLEAR FOR TRAFFIC!

NORMAL LANDING - Is a Landing Heading Directly into the Wind.

Why: Make a Normal Approach and Transition the A/C from the Air to the Ground, Landing into a Headwind.

How to do it:

1. Before Takeoff:
   Use POH to determine T-O & LDG Performance and Limitations.

2. Wind:
   ATIS, Wind-Sock, Tetrahedron, Landing Tee, Segmented Circle.

3. Hazards:
   Power Lines, Traffic, ect...
   Wind Shear and Wake Turbulence Avoidance.

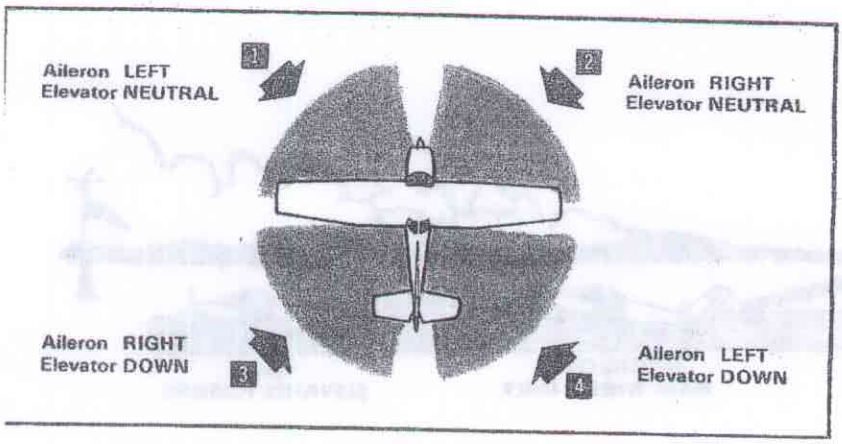
NO PTS

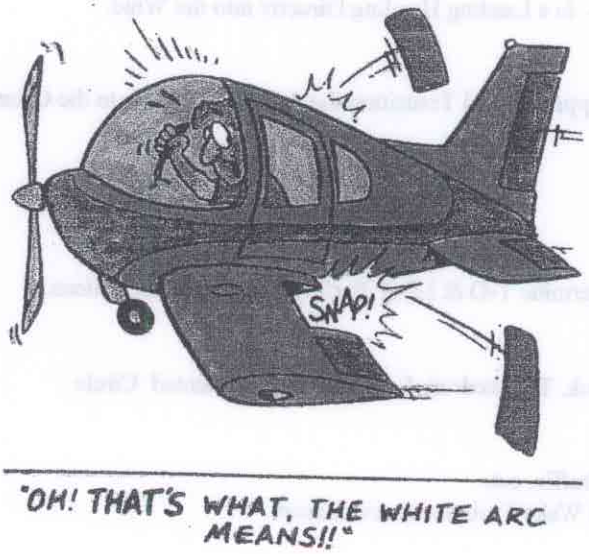
4. Turn Final:
   Aline with RWY center line.
   Verify Gear and Flaps are Down.
   Use Approach Speed in POH. 85mph
   Trim.

5. Start Flare:
   By Applying Back-Pressure about ~~20-30'~~ 5-10' AGL.
   Power Idle

6. Touchdown:
   Nose UP
   Power Idle.
   Land on Main Wheels
   Let Nose Wheel Down Gently and Smoothly.

7. Roll - Out:
   Yoke Full Aft Position.
   Apply Brakes to Slow Down.





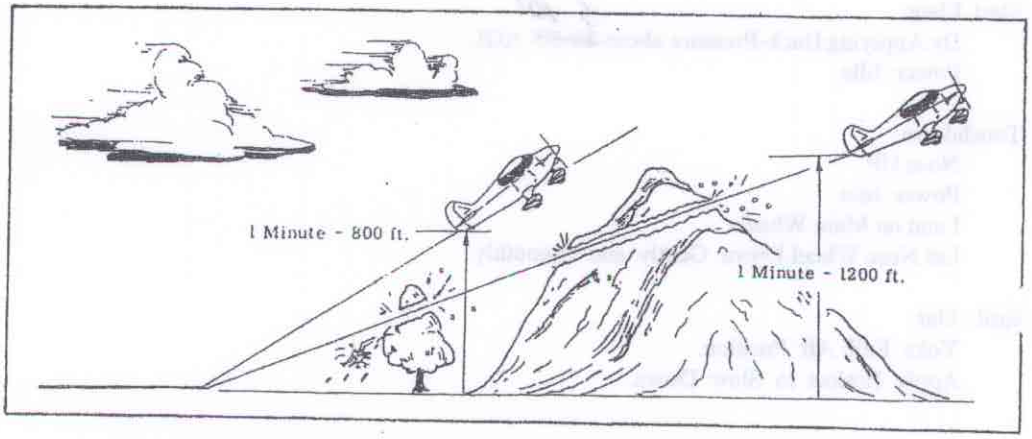


Fig. 5-9. Exaggerated comparison of max angle and best rate of climb.

LESSON FORWARD SLIP TO A LANDING STUDENT _____ DATE _____

OBJECTIVE	▣ **DISSIPATE ALTITUDE BY INCREASING THE RATE OF DESCENT, AND STEEPEN THE DESCENT FLIGHT PATH WITHOUT INCREASING AIRSPEED BY FORWARD SLIPPING USING CROSSED-CONTROLS. SLIPS ARE USED TO CORRECT MINOR ERRORS IN JUDGMENT ON LANDING APPROACHES.**
ELEMENT	▣ **Coordination (appropriate control application)** **Airspeed control** **Heading control** **Purpose** **Technique** **Limitation** **Effect on airspeed indications**
INSTRUCTOR'S ACTIONS	▣ **ORAL DESCRIPTION OF THE ELEMENTS & COMMON ERRORS:** **1. Configuration, Power, and Trim.** **2. Obstructions & Other Hazards which should be Considered.** **3. A Stabilized Slip at the Appropriate Airspeed to the Selected Touchdown Area.** **4. Possible Airspeed Indication Errors.** **5. Proper Application of Flight Controls.** **6. A Precise Ground Track.** **7. Wind Shear and Wake Turbulence.** **8. Timing, Judgment, and Control Technique during Transition from Slip to Touchdown.** **9. Directional Control After Touchdown.** **0. Use of Brakes.** **1. Use of Checklist.** **2. Instructor's Demo.**
STUDENT'S ACTIONS	▣ Lessen, Take Notes, Ask Questions.
COMPLETION STANDARDS	▣ **THE STUDENT SHOULD BE ABLE TO TOUCH DOWN SMOOTHLY AT THE APPROPRIATE STALLING SPEED, AT OR WITH 400 FEET BEYOND A SPECIFIED POINT, WITH NO SIDE DRIFT, AND WITH THE AIRPLANE'S LONGITUDINAL AXIS ALIGNED WITH AND OVER RUNWAY CENTERLINE.**

SCHEDULE

Pre-flight discussion	:10
Instructor's Demo	:15
Student practice	:30
Post-flight critique	:15
Total Time	1:10

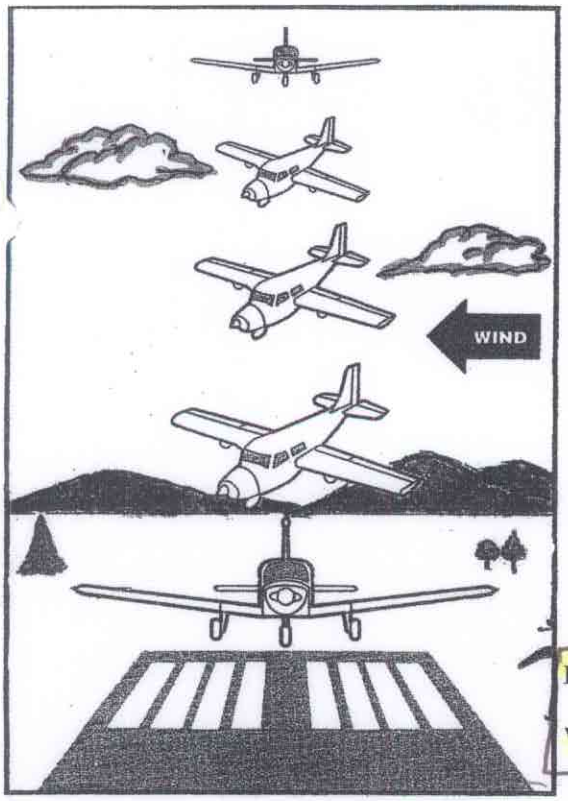
EQUIPMENT Handouts,

COMMON ERRORS

1. **Poor coordination**
2. **Poor airspeed control**
3. **Poor heading control**
4. **Skidding on recovery**
5. **Poor timing**

ASSOCIATED MANEUVERS

1. **Descents without power**
2. **Crosswind landings**
3. **Precision approaches**
4. **Short-field landings**
5. **Simulated forced landings**



CLEAR FOR TRAFFIC!

FORWARD SLIPS Is for Rapid Altitude Loss without Changing Track or A/S.

Why: To develop Technique, Limitation, and the effect on Airspeed Indication.

- Longitudinal Axis away from runway.
- Side Slips: LA - to the runway + wind corrected

How to do it:

1. Wind:
   ATIS, Wind-Sock, Tetrahedron, Landing Tee, Segmented Circle.

   Hazards:
   Pot Holes, Livestock, Wind Shear, Wake Turbulence, or other Hazards.

3. Turn Final:
   Maintain Final Approach Speed.
   Flaps Set.
   Maintain Centerline.

4. 500 Feet AGL:
   Power Idle
   Slip A/C into Wind by Adding Aileron and Full Opposite Rudder.
   Maintain A/S by Adjusting Pitch.
   Use Aileron Control to Stay Aline with center line.

5. Recovery:
   At Proper time release control inputs.
   Raise the Nose to Landing Attitude.

6. Touchdown:
   Landing attitude
   Main wheels first theb Let Nose wheel down gently

7. Roll - Out:
   Maintain Back Pressure on Yoke.
   Slow to Normal Taxi Speed Before Leaving the RWY center line.
   Complete After Landing Checklist.

Remember:
If A/C has One Static Port there will be Errors in A/S indicator.
If Port is on the Left, then A/S will Indicate Lower than Actual.
If Port is on the Right, then A/S will Indicate Higher than Actual.

PTS

Touchdown within 400Ft of point

pitch: nose of A/C in relation to Horizon

LESSON SHORT FIELD TAKEOFF **STUDENT** _____ **DATE** _____

OBJECTIVE

- **TAKEOFF IN THE SHORTEST POSSIBLE DISTANCE, CLEAR OBSTACLES AT END OF THE RUNWAY.**

ELEMENTS

- **50 foot obstacle**
  Airspeed Management
  Power Application
  Vx/Vy
  Performance Charts
  Flap Usage
  Pitch Control
  Use of trim
  Density Altitude Check
  Configurations
  Emergency Procedures
  Expected Performance For Existing Operating Conditions

SCHEDULE

Instructor's Demo	:15
Pre-flight discussion	:10
Student practice	:40
Post-flight critique	:10
Total Time	1:15

QUIPMENT

- Handouts, Performance charts, FTH 91
  Planning Your TAKEOFF

INSTRUCTOR'S ACTIONS

- **ORAL DESCRIPTION OF THE ELEMENTS & COMMON ERRORS:**

1. **Review of wind conditions.**
2. **Takeoff and climb hazards, related to obstacles.**
3. **Use of wing flaps.**
4. **How to position and align the airplane for maximum utilization of available takeoff area.**
5. **Initial positioning of flight controls.**
6. **Power application.**
7. **Directional control during acceleration on the surface.**
8. **Lift-off attitude and airspeed.**
9. **Initial climb attitude and airspeed (Vx) until obstacle is cleared (50 feet AGL).**
0. **Track during climb.**
1. **Use of checklist.**
2. **Instructor's Demo.**

OMPLETION STANDARDS

- **STUDENT WILL PERFORM SHORT-FIELD T-O ON RUNWAY CENTERLINE: ACCELERATE TO Vx +5 / -0 kts UNTIL OBSTACLE IS CLEARED THEN ACCELERATE TO Vy +/- 5 kts;**

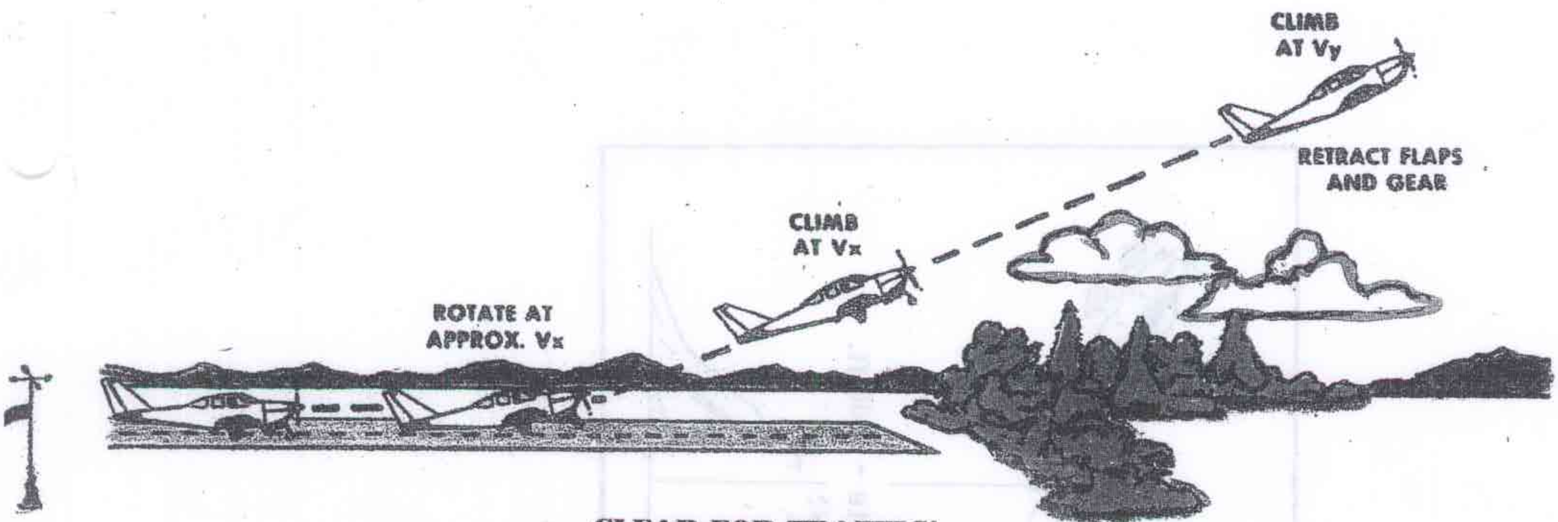
STUDENT'S ACTIONS Listen, Take Notes, and Ask Questions.

COMMON ERRORS

1. **Poor planning**
2. **Poor airspeed control**
3. **Failure to control heading**
4. **Poor power control**

ASSOCIATED MANEUVERS

1. **Slow flight**
2. **Takeoffs and landings**
3. **Power approaches**
4. **Maximum angle-of-climb airspeed**



CLEAR FOR TRAFFIC!

SHORT - FIELD TAKEOFF Is a takeoff with a 50' Obstacle That Must Be Cleared Shortly After Takeoff. Or a shorter than standard runway

Why: To develop the skill and Knowledge of Appropriate Airspeeds, Configurations, Emergency Procedures, and expected Performance for existing Operating Conditions.

How to do it:

1. Before Takeoff:
   Use POH to determine T-O & LDG Performance and Limitations.

2. Wind:
   ATIS, Wind-Sock, Tetrahedron, Landing Tee, Segmented Circle.

3. Hazards:
   Pot Holes, Livestock, Wind Shear, Wake Turbulence, or other Hazards.

4. Flaps:
   Use Recommended Flap Setting in POH. 25°

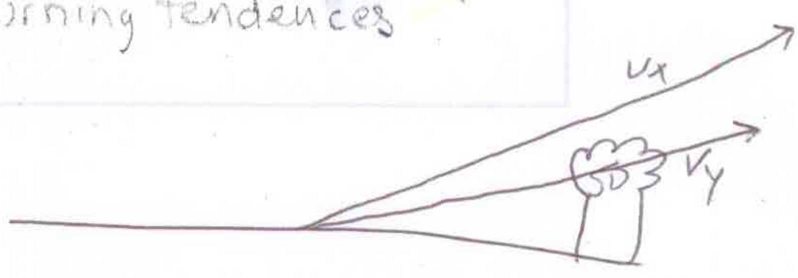
5. Taxi on Runway:
   - C.A.R.E.
   - At End of the Runway.
   - Hold Brakes and Add Maximum Power.
   - Check Engine Gauges and ~~Static Power~~. RPM
   - Release Brakes. — Ck Set Left turning tendences

Takeoff - Roll:
   - Stay Aline with Rudder.
   - A/S is Alive. 70 mph
   - Rotate at (Vr) By Applying Back Pressure.
   - ~~Tail slightly low~~

7. Lift - Off: 85 mph
   - Climb at Vx and Aim for the Horizon.
   - Keep one Hand on Throttle.
   - Keep Wings Level with Ailerons and Trim.

8. Climb - Out:
   - Track center line with DG.
   - Cleared Over the Obstacle, Pitch for Vy. 100 mph
   - Retract Flaps then Gear.
   - Pattern Altitude Pumps Off.
   - Check Engine Gauges.
   - Set A/S for Cruise Climb. 110 mph
   - Complete After Takeoff Check List.

PTS
Vx +5/-0 kts
50ft above
Vy ±5 kts



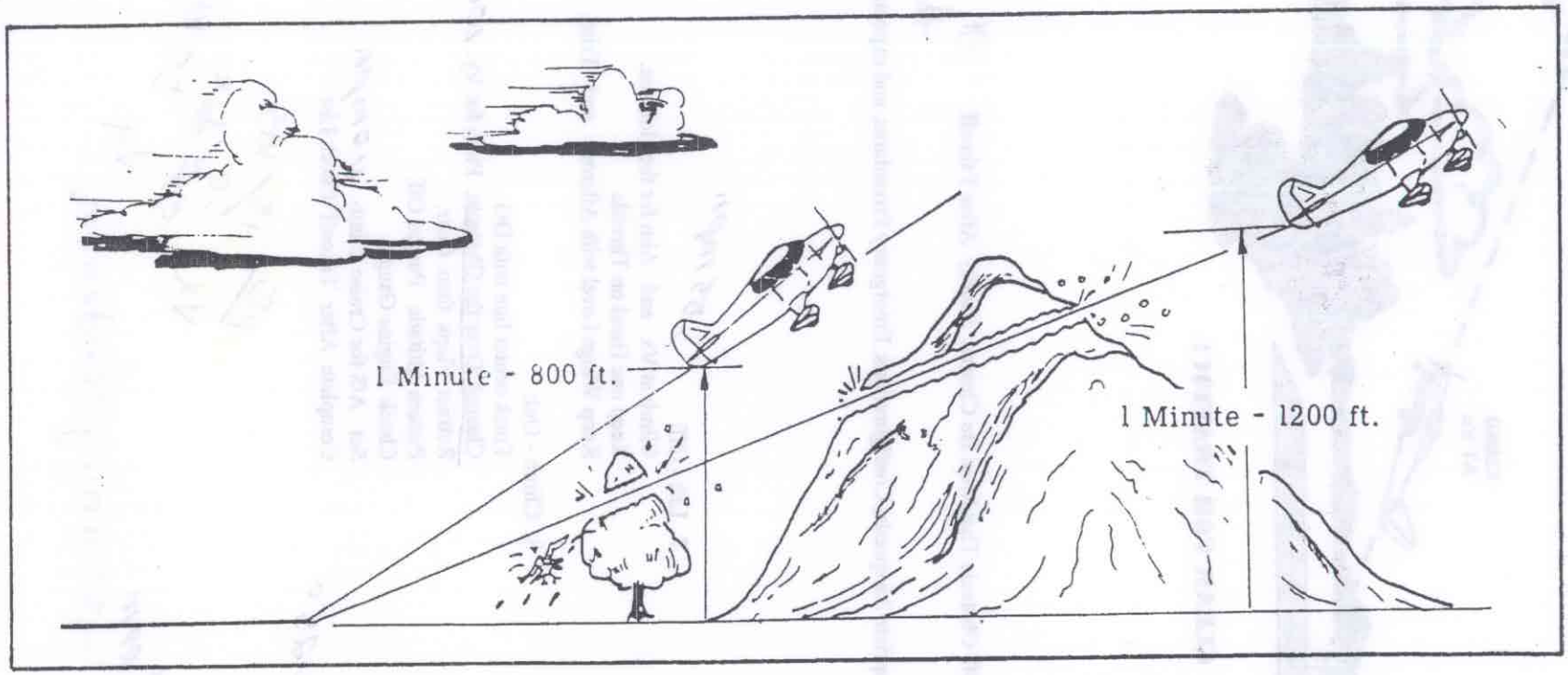


Fig. 5-9. Exaggerated comparison of max angle and best rate of climb.

LESSON SHORT FIELD APP & LDG STUDENT DATE

JECTIVE

★ TO DEVELOP ONE'S ABILITY TO LAND THE PLANE IN A RELATIVELY SHORT LANDING AREA OR WHERE AN APPROACH MUST BE MADE OVER AN OBSTACLE.

ELEMENTS

FTH 110

★ SHORT FIELD LANDING
★ A/S CONTROL OR 1.3 Vso
★ CONSTANT RATE OF DESCENT
★ CONSTANT HEADING
★ USE OF FLAPS (POH)
★ CONSTANT ANGLE IN DESCENT

NSTRUCTOR'S ACTIONS

★ ORAL DESCRIPTION OF ELEMENTS & COMMON ERRORS:

1. HOW TO DETERMINE LDG PERFORMANCE AND LIMITATIONS
2. CONFIGURATION AND TRIM
3. PROPER USE OF PITCH AND POWER TO MAINTAIN DESIRED APPROACH ANGLE
4. BARRIERS AND OTHER HAZARDS WHICH SHOULD BE CONSIDERED
5. EFFECT OF WIND
6. SELECTION OF TOUCHDOWN AND GO-AROUND PTs
7. A STABILIZED APPROACH AT THE RECOMMENDED A/S TO THE SELECTED TOUCHDOWN PT.
8. COORDINATION OF FLIGHT CONTROLS
9. A PRECISE GROUND TRACK
10. TIMING, JUDGMENT, AND CONTROL TECH. DURING ROUNDOUT AND TOUCHDOWN
11. DIRECTIONAL CONTROL AFT TOUCHDOWN
12. USE OF BRAKES
13. USE OF CHECKLIST
14. INSTRUCTOR DEMO

STUDENTS'S ACTIONS

★ TO EXPLAIN THE ELEMENTS INVOLVED, AND ABLE TO FLY THE APPROACH WITH POWER ON.

COMPLETION STANDARDS

★ MAINTAINS A STABILIZED DESCENT ANGLE, PRECISE CONTROL OF THE DESCENT RATE, AND A/S WITH GUST CORRECTION APPLIED.
★ TOUCHES DOWN SMOOTHLY BEYOND AND WITHIN A SPECIFIED POINT, WITH MINIMUM FLOAT, NO DRIFT AND THE AIRPLANE'S LONGITUDINAL AXIS ALIGNED WITH THE RUNWAY CENTERLINE.

	PRIVATE &	COMMERCIAL
*	+/- 5 Kts	=>
*	LANDS WITHIN 200 ft. OF SPECIFIED POINT	W/IN 100 ft. =>

MMON ERRORS

★ POOR : PLANNING, A/S CONTROL & POWER CONTROL
FAILURE TO CONTROL HEADING

3. How is a short-field approach and landing performed?

a. Establish a normal traffic pattern.

b. At midfield, on downwind, complete a pre-landing checklist.

c. Abeam the touch down point on downwind, reduce power.

d. Maintain altitude and level pitch attitude momentarily to dissipate airspeed.

e. Retrim aircraft to establish airspeed within flap operating range (white arc).

f. Lower flaps to 10°.

g. Establish initial approach airspeed (1.4 x V_{SO}); Retrim if necessary.

h. At an approximate 45°-point from the landing threshold (30° point for a short field with obstacle), clear for traffic and turn base.

i. Extend flaps and retrim if necessary to maintain approach airspeed; apply wind drift correction.

j. Lead turn to final to roll out on runway extended centerline.

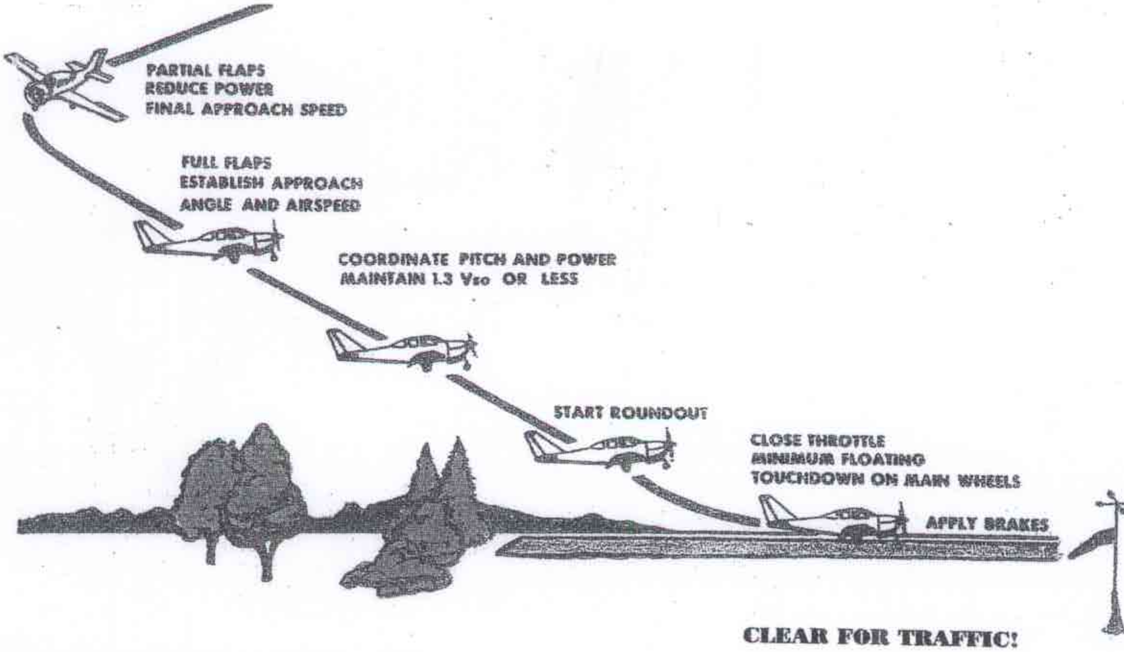
k. Extend full flaps on final.

l. Adjust pitch for an approach airspeed of 1.3 x V_{SO} and adjust power to control rate of descent.

m. If landing over a 50-foot obstacle, when clear, adjust pitch attitude slightly to establish rate of descent. Do not reduce power until in ground effect.

n. If landing with no obstacle, adjust descent angle to land just inside of the desired touchdown point.

o. After landing, identify and retract flaps, and apply maximum braking and full elevator back pressure.

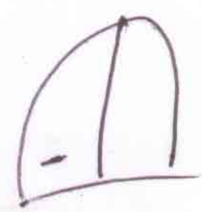


SHORT - FIELD APPROACH AND LANDING

Is a landing on a runway that is Shorter than a Standard size runway and / or a 50' Obstacle Exist at the Approach End of the Runway.

Why: To develop Coordination, Planning, Configuration, and Airspeed Control.

How to do it:



1. Before Takeoff:
   Use POH to determine T-O & LDG Performance and Limitations.

2. Do a Fly-By if Uncontrolled:
   To Check Field Conditions such as Pot Holes, livestock, or other Hazards.

3. Wind:
   ATIS, Wind-Sock, Tetrahedron, Landing Tee, Segmented Circle.

4. Hazards:
   Power Lines, Traffic, ect...
   Wind Shear and Wake Turbulence Avoidance.

5. Turn Final:
   Aline with RWY center line.
   Verify Gear and Flaps are Down.
   Use Approach Speed listed in POH. (85)
   Trim.

6. Start Flare:
   By Applying Back Pressure about ~~20—30~~ 5-10' AGL.
   Reduce Power - to reach power off stall attitude, near stall speed at touchdown.

7. Touchdown:
   Power Idle.
   Nose UP Attitude.
   Main Wheels First.
   Let Nose Down Gently.

8. Roll - Out:
   Retract Flaps.
   Yoke Full Aft Position.
   Apply Brakes.

PTS — pvt / comm
A/S: +10/-5 kts | ±5 kts
TD: 200 ft from point | 100 ft from point.

LESSON SOFT FIELD TAKEOFF **STUDENT** _____ **DATE** _____

OBJECTIVE

- **GET THE AIRPLANE AIRBORNE AS QUICKLY AS POSSIBLE TO ELIMINATE DRAG CAUSED BY TALL GRASS, SAND, MUD, AND SNOW.**

ELEMENTS

Running W/ A RAKE Behind You

- **Airspeeds Management**
- **Power application**
- **Vx / Vy**
- **Flap Usage**
- **Pitch Control on take-off roll**
- **Ground Effect**
- **Configuration**
- **Emergency Procedures**
- **Hazards Associated With A/S < Vx**

SCHEDULE

Pre-flight discussion	:10
Instructor demonstration	:15
Student practice	:40
Post-flight critique	:10
Total Time	1:15

EQUIPMENT

- Handouts, Performance charts, FTH 92

INSTRUCTOR'S ACTIONS

- **ORAL DESCRIPTION OF THE ELEMENTS & COMMON ERRORS:**

1. **Factors Related to the Transfer of Airplane Weight from the Landing Gear to the Wings as Rapidly as Possible.**
2. **Review of Wind Conditions and Takeoff Surface.**
3. **Use of Wing Flaps.**
4. **How to align the airplane with the takeoff path without stopping.**
5. **Initial positioning of flight controls.**
6. **Power application.**
7. **Directional control during acceleration on the surface.**
8. **X-wind control technique during acceleration on the Surface.**
9. **Lift-off attitude and airspeed.**
0. **Acceleration in ground effect to climb airspeed (Vy).**
1. **Track during climb.**
2. **Use of checklist.**
3. **Instructor's Demo.**

STUDENT'S ACTIONS

- Listen, Take Notes, and Ask Questions

COMPLETION STANDARDS

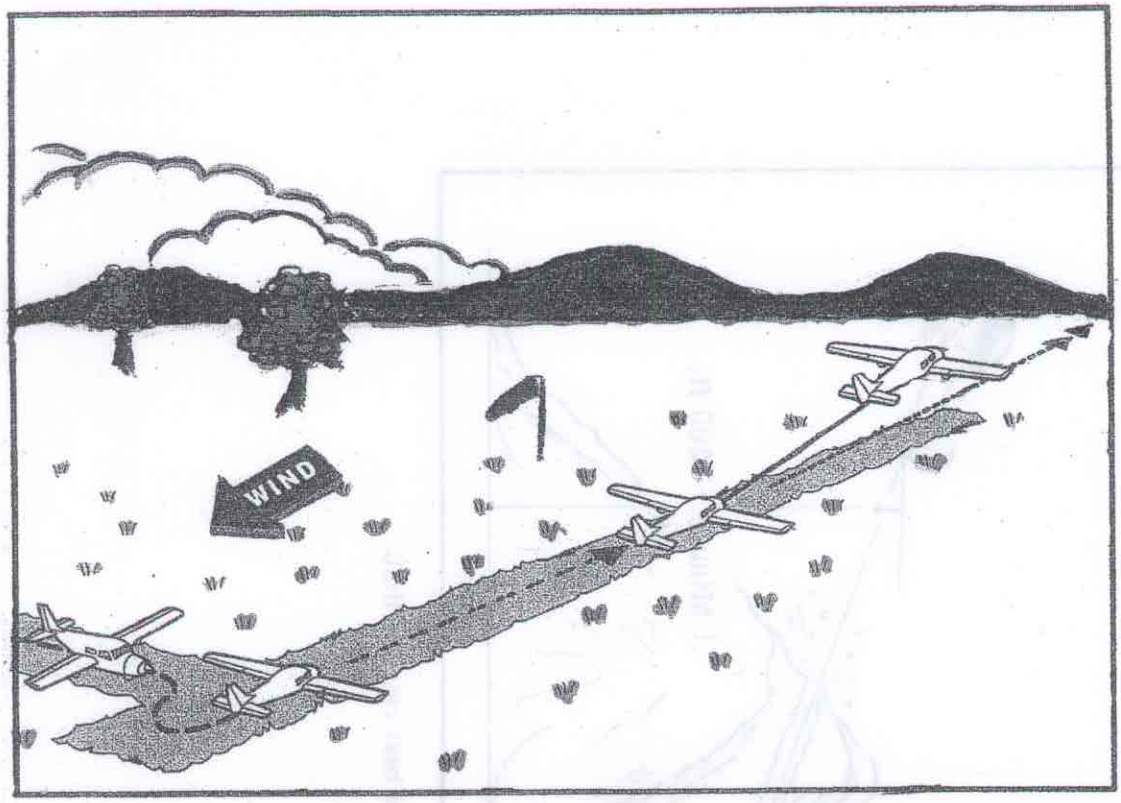
- **STUDENT WILL PERFORM SOFT - FIELD TAKEOFF: ACCELERATE IN GROUND EFFECT TO Vx +5 / -0 kts OR Vy +/- 5 kts; RETRACT FLAPS AT SAFE ALTITUDE;**

COMMON ERRORS

1. **Poor planning**
2. **Poor airspeed control**
3. **Failure to maintain heading**
4. **Poor power management**
5. **Poor coordination**

ASSOCIATED MANEUVERS

1. **Slow flight**
2. **Takeoffs and landings**
3. **Power approaches**
4. **Full-stall landing**



CLEAR FOR TRAFFIC!

SOFT - FIELD TAKEOFF Is one in which the A/C becomes airborne as soon as possible.

Why: To eliminate drag on the wheels also damage to the A/C when a normal takeoff is not wise.

How to do it:

1. Wind:
   ATIS, Wind-Sock, Tetrahedron, Landing Tee, Segmented Circle.

2. Flaps:
   As Recommended by POH. 250

3. Taxi on Runway:
   C.A.R.E.
   Without Stopping
   Yoke Full Aft.
   Check Engine Gauges.

4. Takeoff - Roll
   Maintain Proper Attitude with Nose Wheel Off the Ground.

5. Lift - Off:
   Lower Pitch to remain in Ground Effect.
   Accelerate to Vy 100 mph
   Maintain Center Line.

. Climb Out:
   Hold Vy
   Retract Gear and Flaps

PTS

comm / Vy ±5

pvt / Vy +10 -5

ground effect
or improved performance where there is reduced upwash and downwash and reduced wing-tip vortices
area (1 wingspan from ground)
Table

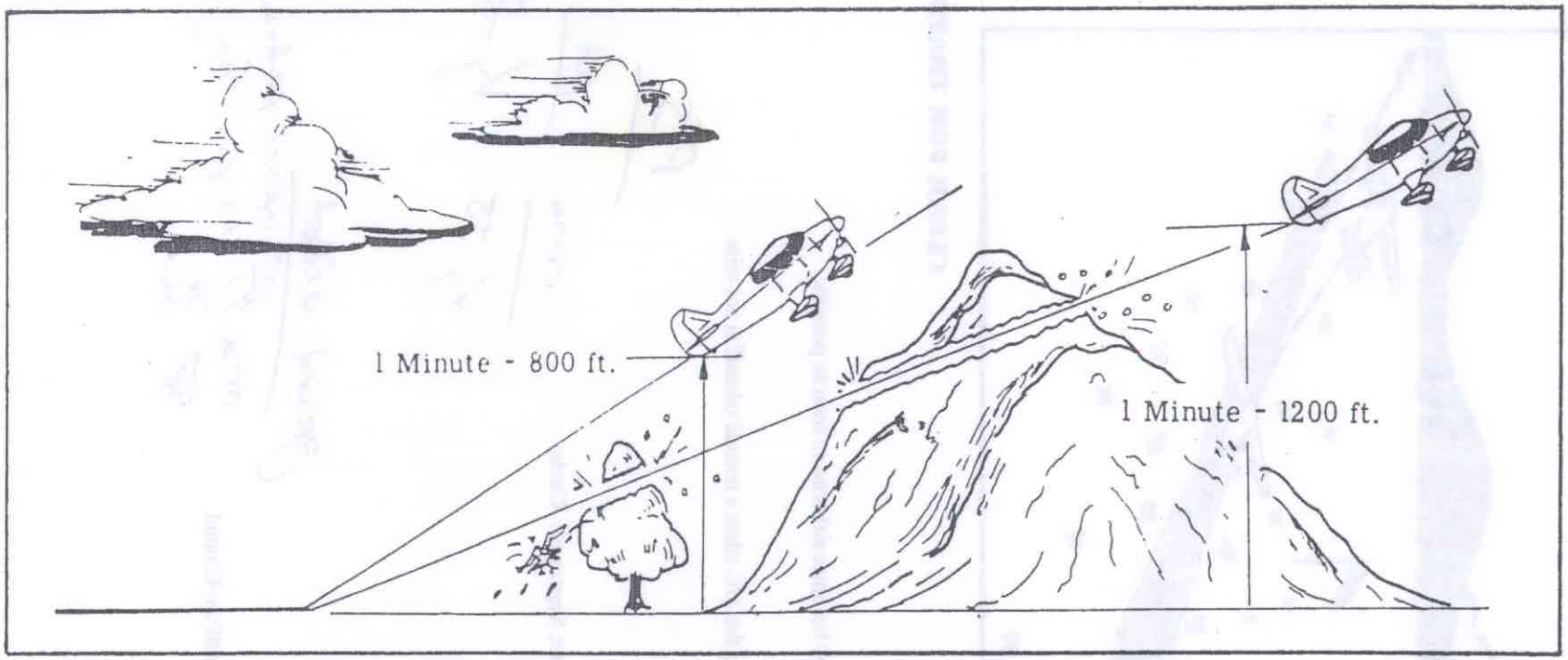


Fig. 5-9. Exaggerated comparison of max angle and best rate of climb.

LESSON SOFT FIELD APP & LDG **STUDENT** **DATE**

OBJECTIVE

- ★ TO FAMILIARIZE ONE WITH THE NEED FOR A SOFT FIELD LDG BECAUSE OF THE SURFACE OF THE RUNWAY - SUCH AS GRASS, SAND, MUD, SNOW OR ROUGH TERRAIN.
- ★ ONE MUST CONTROL THE PLANE SO THAT THE WINGS SUPPORT THE ITS WEIGHT AS LONG AS POSSIBLE, TO MINIMIZE DRAG & STRESSES IMPOSED ON THE LANDING GEAR BY THE ROUGH SURFACE.

ELEMENTS

FTH 112

- ★ FIELD CONDITIONS
- ★ NORMAL APPROACH SPEED
- ★ HOLD THE PLANE OFF THE GROUND WHEN FLARING
- ★ USE OF FLAPS
- ★ HOLD NOSE WHEEL OFF AS LONG AS POSSIBLE
- ★ INCREASE OF POWER DURING & AFTER TOUCHDOWN
- ★ * NO BRAKES *

INSTRUCTOR'S ACTIONS

- ★ ORAL DESCRIPTION OF ELEMENTS & COMMON ERRORS:

1. HOW TO DETERMINE LDG PERFORMANCE AND LIMITATIONS
2. CONFIGURATION AND TRIM
3. OBSTRUCTIONS AND OTHER HAZARDS WHICH SHOULD BE CONSIDERED
4. EFFECT OF WIND AND LANDING SURFACE
5. SELECTION OF A TOUCHDOWN AREA
6. A STABILIZED APPROACH AT THE RECOMMENDED A/S TO THE SELECTED TOUCHDOWN AREA
7. COORDINATION OF FLIGHT CONTROLS
8. A PRECISE GROUND TRACK
9. TIMING, JUDGMENT, AND CONTROL TECHNIQUE DURING ROUNDOUT AND TOUCHDOWN
10. PROPER USE OF POWER
11. DIRECTIONAL CONTROL AFTER TOUCHDOWN
12. USE OF CHECKLIST
13. INSTRUCTOR DEMO

STUDENTS'S ACTIONS

- ★ LISTENING, TAKING NOTES AND ASKING QUESTIONS

COMPLETION STANDARDS

- ★ MAINTAINS A STABILIZED APP, CONTROLLED RATE OF DESCENT, & RECOMMENDED A/S (1.3 Vso) W/ GUST CORRECTION FACTOR APPLIED, +/- 5 Kts.
- ★ MAKES SMOOTH, TIMELY, AND CORRECT CONTROL APPLICATION DURING THE ROUNDOUT & TOUCHDOWN.
- ★ REMAINS AWARE OF POSSIBILITY OF WIND SHEAR AND/OR WAKE TURBULENCE.
- ★ TOUCHES DOWN AT A MINIMUM DESCENT RATE AND A/S, WITH NO DRIFT, AND WITH THE AIRPLANE'S LONGITUDINAL AXIS ALIGNED WITH AND OVER THE LANDING SURFACE CENTERLINE.
- ★ KEEPS NOSE WHEEL OFF RUNWAY AS LONG AS POSSIBLE

COMMON ERRORS

- ★ POOR : PLANNING, A/S CONTROL, POWER MANAGEMENT & COORDINATION FAILURE TO MAINTAIN HEADING

How is a soft field approach and landing performed?

a. Establish a normal traffic pattern.

b. At midfield, on downwind, complete a pre-landing checklist.

c. Abeam the touch down point on downwind, reduce power.

d. Maintain altitude and level pitch attitude momentarily to dissipate airspeed.

e. Retrim aircraft to establish airspeed within flap operating range (white arc).

f. Lower flaps to 10°.

g. Establish initial approach airspeed (1.4 x V_{SO}); Retrim if necessary.

h. At an approximate 45°-point from the landing threshold (30°-point for a short field with obstacle), clear for traffic and turn base.

i. Extend flaps and retrim if necessary to maintain approach airspeed; apply wind-drift correction.

j. Lead turn to final to roll out on runway extended centerline.

k. Extend full flaps on final.

l. Adjust pitch for an approach airspeed of 1.3 x V_{SO} and adjust power to control the rate of descent

m. Touch down at the lowest possible airspeed with the airplane in a nose-high pitch attitude.

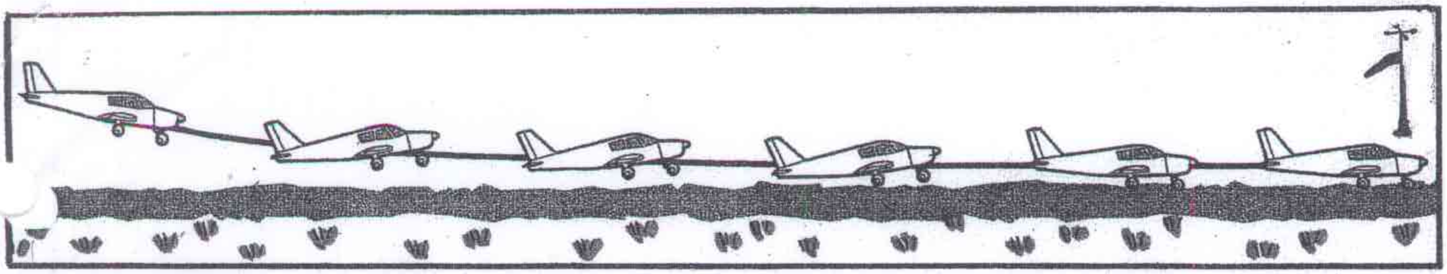
n. After the main wheels touch the surface, hold sufficient back elevator pressure to keep the nose wheel off the ground until it can no longer aerodynamically be held off the field surface.

o. Gently lower the nose wheel to the surface.

p. A slight addition of power during and immediately after the touch down will aid in easing the nose wheel down.

q. Avoid the use of brakes.

r. Increase power, as necessary, to keep the airplane moving and from becoming stuck in the surface.



CLEAR FOR TRAFFIC!

SOFT - FIELD LANDING Is one in which the A/C Touches-Down in a Nose High Attitude with the Lowest A/S Possible because of Grass, Sand, Mud, Snow or Rough Terrain..

Why: Because using a Normal Landing Approach could Cause the A/C to Nose-Over at Touchdown.

How to do it:

1. Before Takeoff:
   Use Performance Charts in POH.

2. Use of Fly -By:
   To Check Field Conditions for pot holes, livestock, or other Hazards.
   ATIS, Wind-Sock, Tetrahedron, Landing Tee, Segmented Circle.

3. Sign's:
   Deep Rich Green = Very Soft Ground
   Deep Rich Brown= Very Soft Ground
   Landing Near Standing Water = Very Soft Ground
   Brown - Green like a Pasture is Generally Firm Ground

4. Turn Final:
   Aline with RWY center line.
   Verify Gear and Flaps are Down.
   Approach Speed in POH. 55 mph
   Trim.

5. Start Flare:
   By Applying Back-Pressure about ~~20 - 30~~ 5-10' AGL.
   Keep Residual Power IN.
   Hold A/C Off the Ground for as long as possible by increasing pitch.

6. Touchdown:
   Gently and Smoothly by Adjusting Power.
   Keep increasing Back-Pressure to Hold Nose Off the Ground for as long as possible.

7. Roll-Out:
   Yoke Full Aft. Position.
   Let nose come down Gently by applying power.

Remember:
   Avoid using the Brakes.

PTS
comm: 1.3 Vso +10/-5 kts TD 400 ft
pvt: TD 200 ft ±5 kts 1.3 Vso

comm: Power before Touchdown
Control Sink Rate
The last 20-30'