



VICTORIA FLYING CLUB

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Approach and Landing

- Review Descending, Slow Flight and Slipping
- Definition and Motivation
- **Approach and Landing**
 - **Normal, Short-Field, Soft-Field, Crosswind**
 - Factors
- Summary and Questions
- Pre-Flight Briefing



Review Descending and Slow Flight

- Mentally perform a power-off and power-on descent and state all observations and required actions (PAT).
- Define and state the best glide airspeed.
- How do we recognize that a ground reference can be reached during a descent?
- What is slow flight and how do we recover from the slow flight range?
- Define and state the two stall v-speeds.



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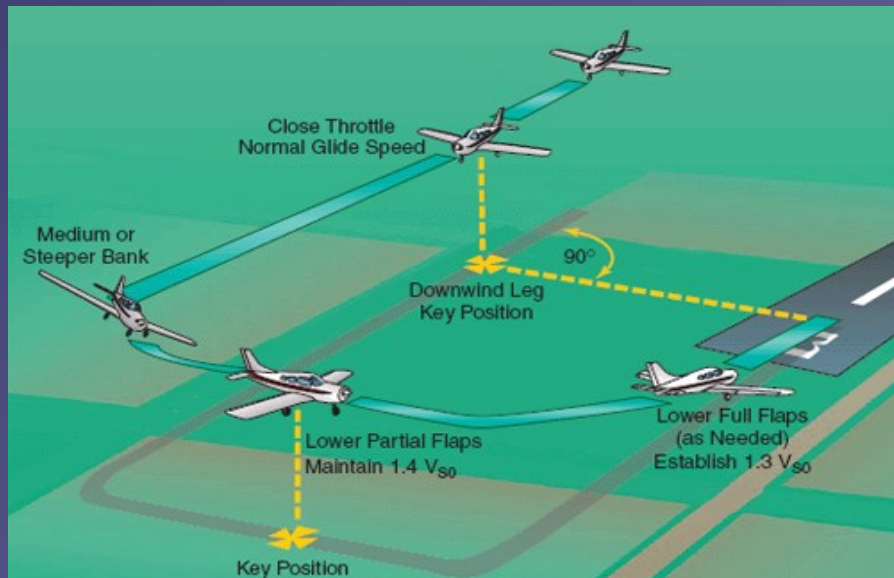
Definition and Motivation



- *Landing is the last part of a flight, where a flying animal, aircraft, or spacecraft returns to the ground.*
- *Stabilized **approach, flare, touchdown, ground roll***
- Essential maneuver used in every single flight



Normal Approach and Landing

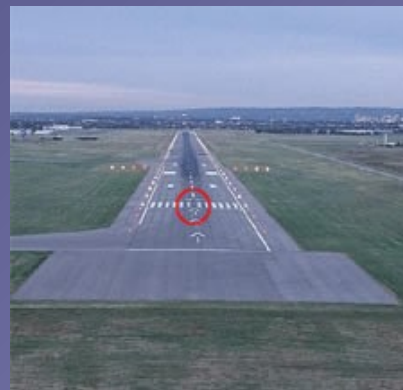
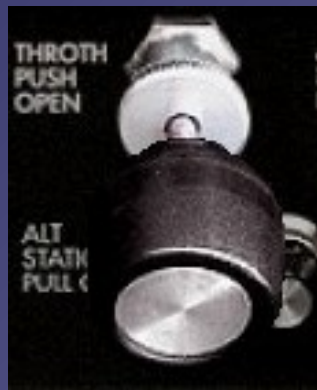


- Criteria: *hard uncontaminated surface, long runway, no obstacles, low density altitude, no or steady headwind*
- Check **environment** and consult **performance** data in POH
- Perform pre-landing checks according to **checklists** in POH
- Conduct passenger, crew arrival and emergency **briefings**



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Normal Landing – Approach



Align and Descent

Perspective

Approach Speed

- Align with **runway** and establish a *stabilized descent*
- Aim for runway threshold to flare into landing zone (**TCH 50 ft**)
- Set **flaps** as required (**10°-20°**) decelerating in **white arc** (below **85 KIAS**)
- *Continuously* check correct **approach airspeed** (**65-75 KIAS**)
- Adjust **attitude** and **power** to maintain **approach perspective**



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Approach Perspective

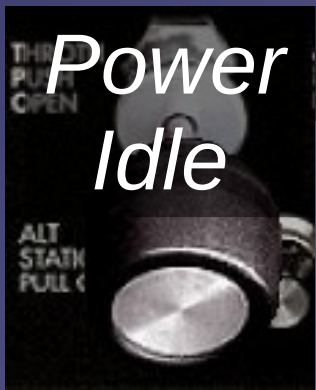


- *Attitude plus Power equals Performance*
- Maintain **descent angle** (perspective) and **attitude**
- Control **descent airspeed** and **rate of descent** with **attitude** and **power**
- Be aware of *potential visual illusions*



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Normal Landing – Flare and Touchdown



- Callout *Landing Assured* before initiating landing flare
- Reduce **power** smoothly to *idle* keeping *straight*
- Use **runway end** as **reference** for directional control
- Continue to decelerate in *level/ slow flight* above runway
- Gently increase **elevator** back-pressure to assume **landing attitude gradually** – *slightly nose-up, main wheels first*



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Normal Landing – Ground Roll

Keep Straight



Runway End



Allow Nose Wheel to Settle

Apply Brakes

- Keep *straight* with **rudder** using **runway end** and **peripheral vision**
- Control **elevator** back-pressure allowing **nose-wheel** to settle
- Gently apply **brakes** keeping *straight* towards **runway end**
- Slow down to taxi speed and vacate runway
- Post-landing checks: flaps, transponder, lights, time, clearance



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Overshoot / Go-Around

Full Power



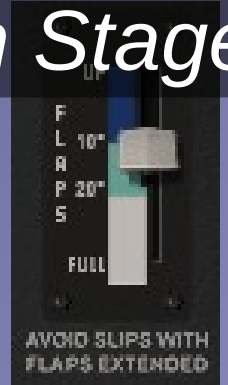
Control Yaw



*Assume Slight
Nose-Up Attitude*



*Flaps Up
In Stages*



- Reasons: balked landing, failures, traffic, animals, humans
- Apply full **power** controlling **yaw** with **rudder**
- Assume a *slight* **nose-up attitude** just above the horizon
- Retract **flaps** to **20°** (balked landing) or **10°** (go-around) *immediately* and accelerate to safe **climb airspeed**
- Maintain **climb airspeed** and retract **flaps** at **safe altitude** in white arc



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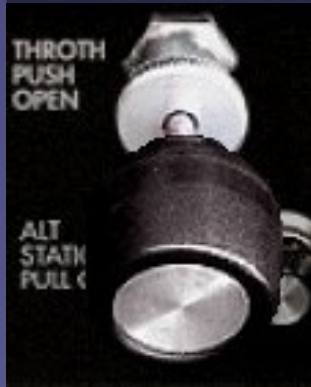
Touch and Go

Flaps

Up



Full Power



Runway End



- Ensure *sufficient runway length* beforehand
- Align with **runway centerline** and keep *straight* with **rudder** first, then
- Retract **flaps** completely during ground roll, **trim** for take-off
- Apply *full* **power** and keep *straight* with **rudder**
- Use **runway end** as **reference** for directional control
- Perform take-off run and initial climb *as required*



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Stop and Go

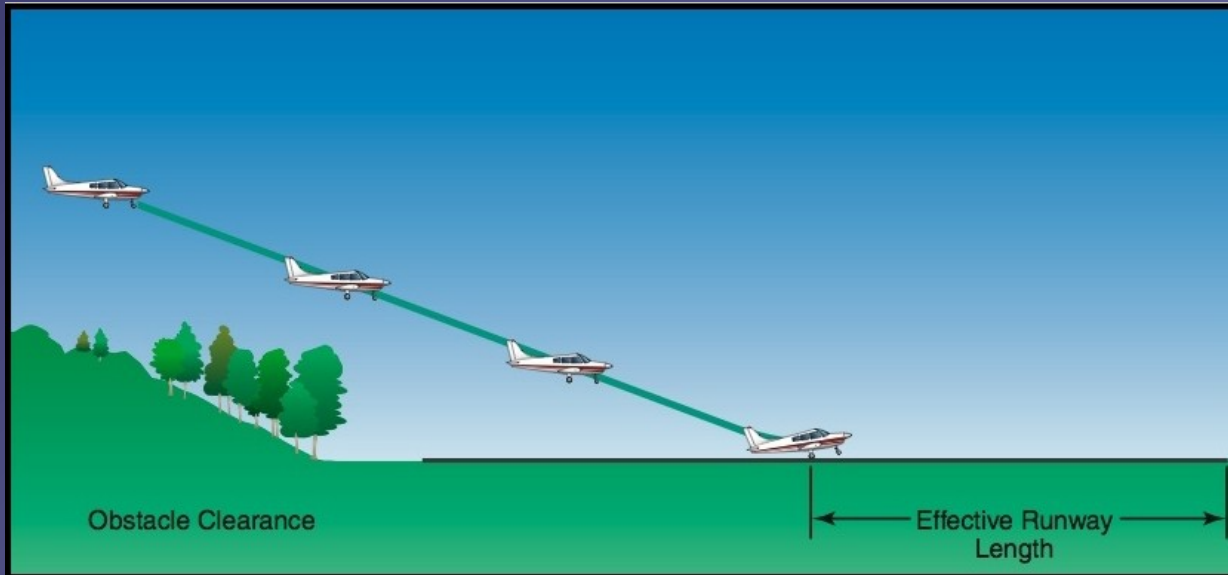


- Ensure *sufficient* **runway length** *beforehand*
- Perform landing to full stop on the runway
- Perform subsequent take-off from stop position



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Short-Field Landing



- Criteria: *hard uncontaminated surface, short runway, obstacles, high density altitude, no or steady headwind*
- Check **environment** and consult **performance** data in POH
- Pre-landing checks according to **checklists** in POH
- Conduct passenger, crew arrival and emergency **briefings**



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Short-Field Landing – Approach



Align and Descent

Perspective

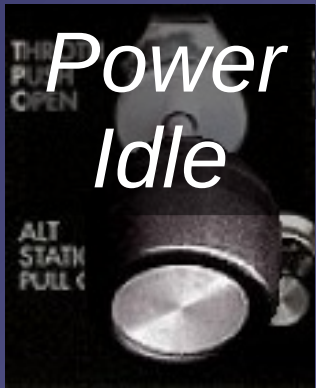
Approach Speed

- Align with **runway** and establish a *stabilized descent*
- Aim for runway threshold to flare into landing zone (**TCH 50 ft**)
- Set *full flaps* (**30°**) decelerating in **white arc** (*below 85 KIAS*)
- *Continuously* check correct *final approach airspeed* (**61 KIAS**)
- Adjust **attitude** and **power** to maintain **approach perspective**



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Short-Field Landing – Flare and Touchdown



- Callout *Landing Assured* before initiating landing flare
- Reduce **power** to *idle* keeping *straight*
- Use **runway end** as **reference** for directional control
- Continue to decelerate in *level* **slow flight** above runway
- Gently increase **elevator** back-pressure to assume **landing attitude** *gradually* – *slightly nose-up, main wheels first*



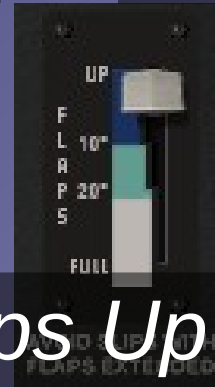
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Short-Field Landing – Ground Roll

Keep Straight Runway End



Flaps Up



Hold Back-Pressure



Apply Brakes

- Keep *straight* with **rudder** using **runway end** and **peripheral vision**
- Control **elevator** back-pressure allowing nose wheel to settle
- Retract **flaps** *immediately* (weight on wheels)
- Apply **brakes** *firmly* without skidding and increase **elevator** back-pressure
- Keep *straight* and slow down to taxi speed and vacate runway
- Post-landing checks: flaps, transponder, lights, time, clearance



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Landing Performance

SHORT FIELD LANDING DISTANCE AT 2550 POUNDS

CONDITIONS:

Flaps 30°
Power Off
Maximum Braking
Paved, level, dry runway
Zero Wind
Speed at 50 Ft: 61 KIAS

Press Alt In Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst
S. L.	545	1290	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	1455	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

NOTES:

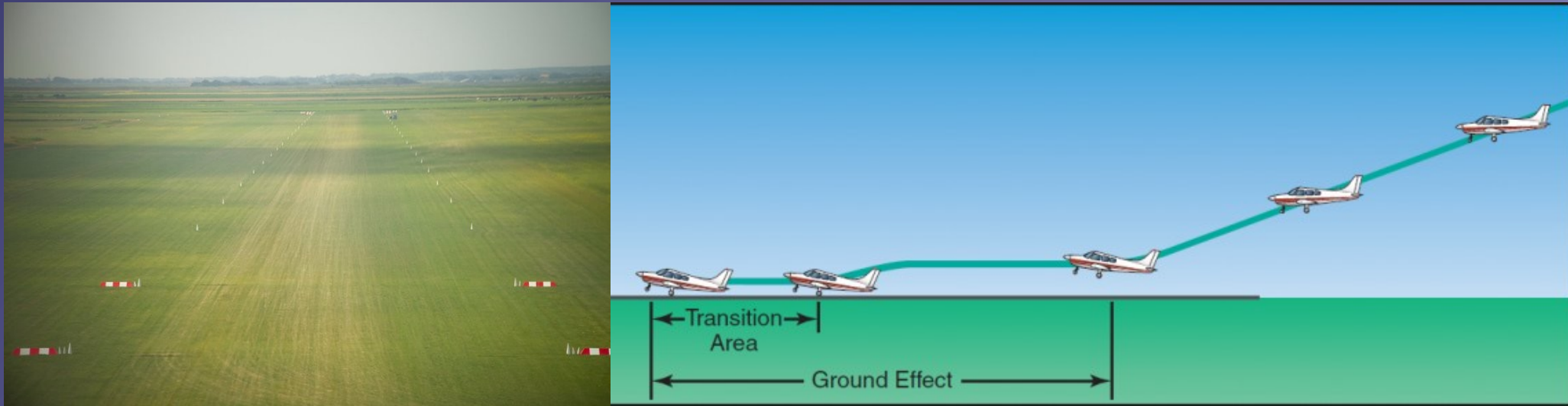
1. Short field technique as specified in Section 4.
2. Decrease distances 10% for each 9 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on dry, grass runway, increase distances by 45% of the "ground roll" figure.
4. If landing with flaps up, increase the approach speed by 9 KIAS and allow for 35% longer distances.

- Consider **conditions**
- Select **pressure altitude**
- Select **temperature**
- Determine required landing **ground roll and distance**
- Apply **corrections** as applicable



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Soft-Field Landing

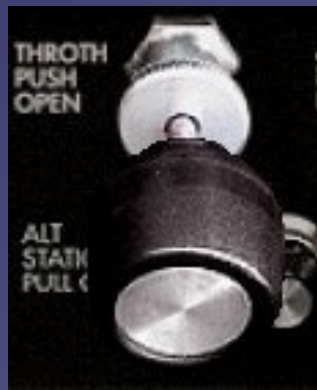


- Criteria: *soft, rough or contaminated surface, long runway, no obstacles, low density altitude, no or steady headwind*
- Check **environment** and consult **performance** data in POH
- Pre-landing checks according to **checklists** in POH
- Perform passenger, crew arrival and emergency **briefings**



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Soft-Field Landing – Approach



Align and Descent

Perspective

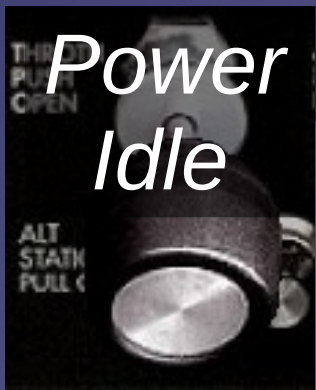
Approach Speed

- Align with **runway** and establish a *stabilized descent*
- Aim for runway threshold to flare into landing zone (**TCH 50 ft**)
- Set *full flaps* (**30°**) decelerating in **white arc** (*below 85 KIAS*)
- *Continuously* check correct *final approach* airspeed (**61-70 KIAS**)
- Adjust **attitude** and **power** to maintain approach perspective



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Soft-Field Landing – Flare and Touchdown



- Callout *Landing Assured* before initiating landing flare
- Reduce **power** to *idle* keeping *straight*
- Use **runway end** as **reference** for directional control
- Continue to decelerate in *level* **slow flight** above runway
- *Gently* increase **elevator** back-pressure to assume **landing attitude** *gradually* – *slightly* **nose-up**
- *Gently* add **power** to relieve **main wheels** controlling touchdown



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Soft-Field Landing – Ground Roll

Keep Straight Runway End



Hold Nose Wheel Off



Keep Rolling

- Keep *straight* with **rudder** using **peripheral vision**
- Adjust **power** and **elevator** back-pressure to hold off nose wheel
- Apply *minimum* **brakes** and keep *straight*
- Keep rolling at taxi speed with **elevator** back-pressure and vacate runway
- Stop on *supporting surface* before retracting **flaps**
- Post-landing checks: flaps, transponder, lights, time, clearance



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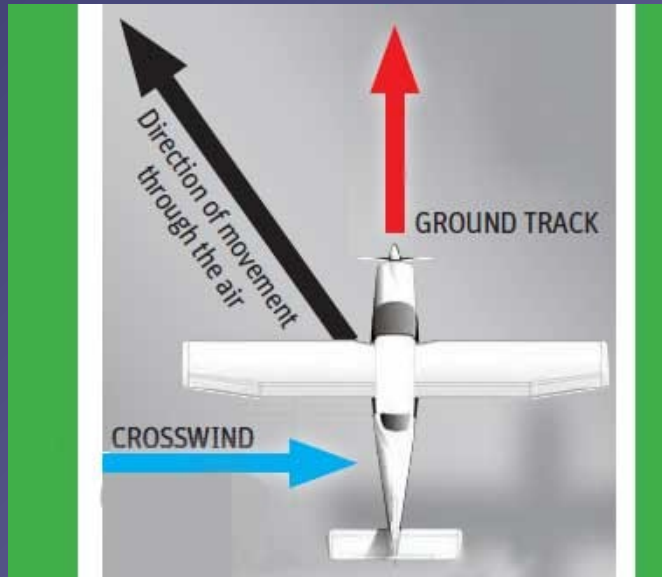
Review Slipping

- Define a slip and explain the difference between a side and a forward slip and their applications.
- Mentally perform a side slip and state all observations and actions.



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Crosswind Landing

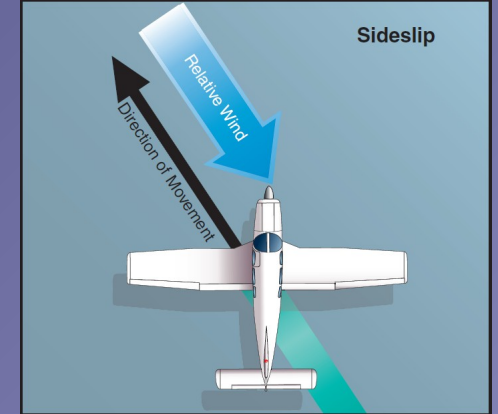


- Criteria: *steady* or *gusty* **crosswind** component
- Check **environment** and consult **performance** data in POH
- Pre-landing checks according to **checklists** in POH
- *Maximum demonstrated* **crosswind** component **15 knots**
- Conduct passenger, crew arrival and emergency **briefings**



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Crosswind Landing – Approach

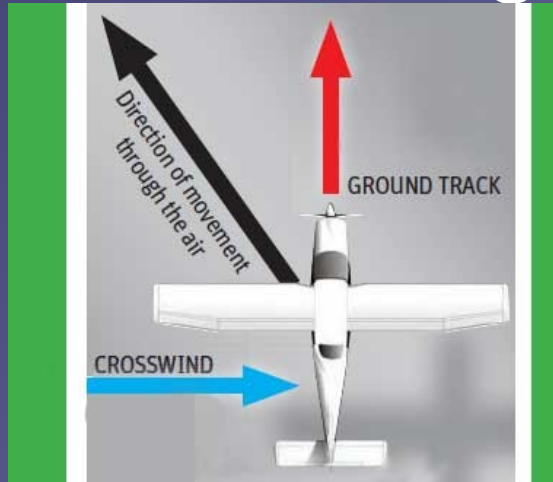


- Align with **runway** and establish a crabbing *stabilized descent*
- Aim for runway threshold to flare into landing zone (***TCH 50 ft***)
- Set *minimum* **flaps** as required decelerating **white arc** (*below 85 KIAS*)
- *Continuously* check correct **approach airspeed** (***65-75 KIAS***)
- Consider higher approach speed in gusts (***gust factor / 2***)
- Adjust **attitude** and **power** to maintain **approach perspective**
- Transition from crab into **side-slip** at ***200' AGL***



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Crosswind Landing – Flare and Touchdown



- Callout *Landing Assured* before initiating landing flare
- Reduce **power** to *idle* keeping *straight* during **side-slip**
- Use **runway end** as **reference** for directional control
- Continue to decelerate **side-slipping** in *level/ slow flight* above runway
- Gently increase **elevator** back-pressure to assume **landing attitude** *gradually* – *slightly nose-up*
- Touch down with *windward wheel first*



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Crosswind Landing – Ground Roll

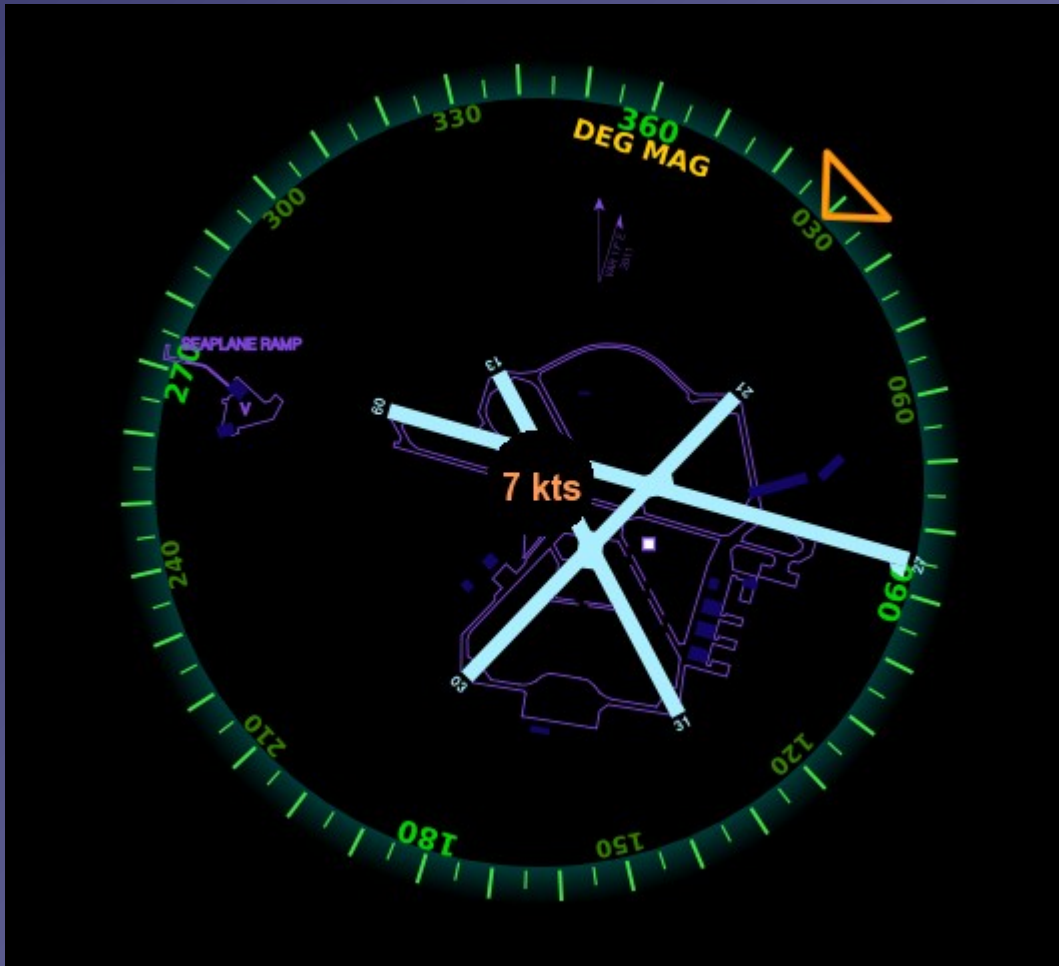


- Keep *straight* with **rudder** using **runway end** and **peripheral vision**
- Allow *leeward* **wheel** to settle and use **aileron** *into* the wind
- Control **elevator** back-pressure allowing nose wheel to settle
- *Gently* apply **brakes** keeping *straight* towards **runway end**
- Slow down to taxi speed increasing **aileron** input and vacate runway
- Post-landing checks: flaps, transponder, lights, time, clearance



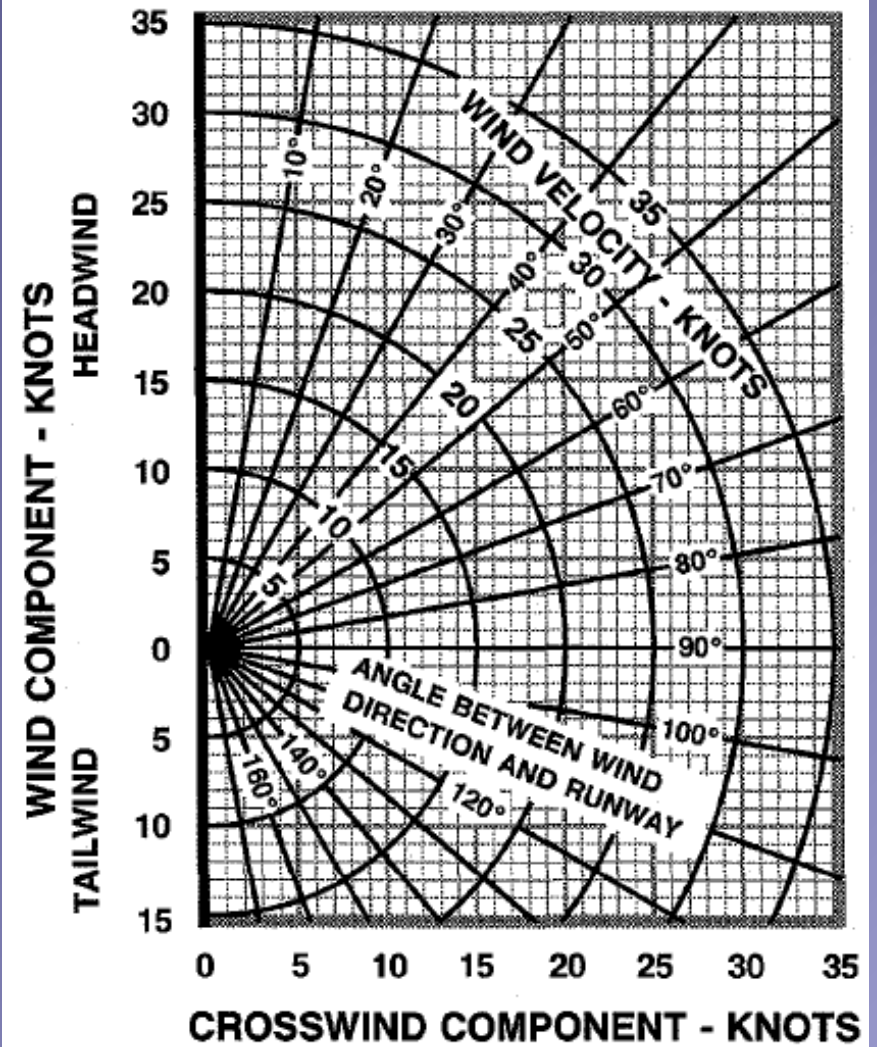
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Crosswind Component



NOTE:

Maximum demonstrated crosswind velocity is 15 knots (not a limitation).





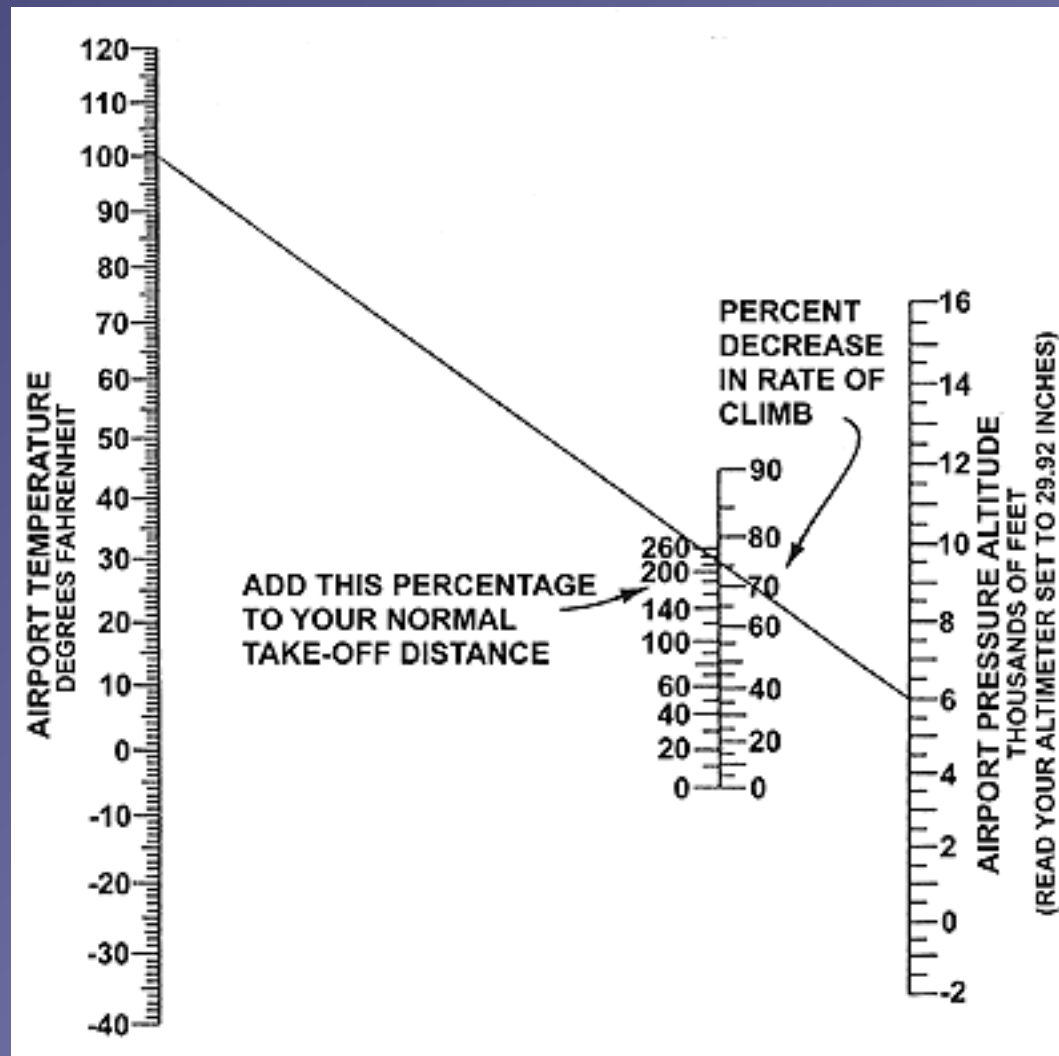
Landing Factors

- Runways and **aerodrome** environment
- **Surface** material (hard, soft, rough) and **slope**
- Surface **contamination** (wet, dry, slush, snow, ice)
- **Air density** (altitude, pressure, temperature, humidity)
- **Wind** and turbulence (head-/tailwind, gusts, windshear)
- **Wake** turbulence
- **Obstacles**
- **Weight** and **balance**
- Ground effect, wheelbarrowing, weathercocking



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Density Altitude – Koch Chart





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High Density Altitude Operations



- Check **environment** and consult **performance** data in POH
- Pre-take-off checks according to **checklists** in POH
- Lean for *maximum* **RPM** above **3000 ft DALT**
- *High* (high density altitude = low air density), *hot, humid*



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Special Take-Offs



- Landings featuring *combined* factors
- Soft, short, high, hot, gusty, heavy, contaminated...



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Wheelbarrowing



- *Higher load on the **nose-wheel** compared to main wheels*
- *Tendency to pivot about the nose wheel may result in ground loop*
- *Before pivoting: ease back **elevator** to reduce weight on **nose wheel***
- *After pivoting: **relax forward elevator** and abort if not stopped*



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Summary / Quiz

- What are the factors affecting landings and the selection of a landing type?
- Mentally perform a short-field landing and state all observations and actions.
- Mentally perform a soft-field landing and state all observations and actions.
- Mentally perform a crosswind landing and state all observations and actions.



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Pre-Flight Briefing

- Exercise
- Training Area
- Departure and Arrival Procedures
- Weather Briefing / NOTAMs
- Aircraft and Documents
- Time and Fuel Requirements
- Safety Considerations and Responsibilities



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Additional Materials

- Additional materials for Approach and Landing
- Flight Instructor Guide – Exercise 18
- Flight Instructor Guide – Lesson Plans 4-6, 8-10, 12-19