Area of Operation **VII** - Task **J**

Soft-Field Approach and Landing

Content

westflying

Key References:
- Airplane Flying Handbook
- POH/AFM

1. Introduction

- **What**: Landing on fields that are rough or have soft surfaces, such as snow, sand, mud, or tall grass
- **Why**: A normal landing on a soft-field runway could result in damage to the gear or the airframe
- **Soft-Field Landing Objectives**:
  - Extend the approach in ground effect
  - Transfer weight from wings to main wheels
  - Maintain back pressure after touchdown
  - Approach is same as normal approach
    - Airspeed is low, similar to “short-field”
    - Often soft-fields are also short-fields
  - Avoid braking

➡ **Standard (ACS):**

- Proper technique, maintain nose wheel off the ground

2. Landing Performance & Limitations

Limitations

- POH Chapter 2
  - *Flaps*
  - *Check for surface limitations*

Performance

- POH Chapter 5
  - *Ground Roll*
  - *Runway required*
  - *See notes*

SECTION 5
PERFORMANCE

CESSNA
MODEL 172S NAV III
GFC 700 AFCS

SHORT FIELD LANDING DISTANCE AT 2550 POUNDS

CONDITIONS:

Flaps FULL
Power IDLE
Maximum Braking

Zero Wind
Paved, Level, Dry Runway
Speed at 50 ft: 61 KIAS

Pressure Altitude Feet	0°C		10°C		20°C		30°C		40°C	
	Gnd Roll Feet	Total Feet To Clear 50 Foot Obst	Gnd Roll Feet	Total Feet To Clear 50 Foot Obst	Gnd Roll Feet	Total Feet To Clear 50 Foot Obst	Gnd Roll Feet	Total Feet To Clear 50 Foot Obst	Gnd Roll Feet	Total Feet To Clear 50 Foot Obst
Sea Level	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

NOTE

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

SECTION 2
OPERATING LIMITATIONS

CESSNA
MODEL 172S NAV III
GFC 700 AFCS

AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown in Figure 2-1. Maneuvering speeds shown apply to normal category operations. The utility category maneuvering speed is 98 KIAS at 2200 pounds.

AIRSPEED LIMITATIONS

SYMBOL	SPEED	KCAS	KIAS	REMARKS
V_{NE}	Never Exceed Speed	160	163	Do not exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising Speed	126	129	Do not exceed this speed except in smooth air, and then only with caution.
V_A	Maneuvering Speed: 2550 Pounds 2200 Pounds 1900 Pounds	 102 95 88	 105 98 90	Do not make full or abrupt control movements above this speed.
V_{FE}	Maximum Flap Extended Speed: FLAPS 10° FLAPS 10° to FULL	 107 85	 110 85	Do not exceed this speed with flaps down.
-----	Maximum Window Open Speed	160	163	Do not exceed this speed with windows open.

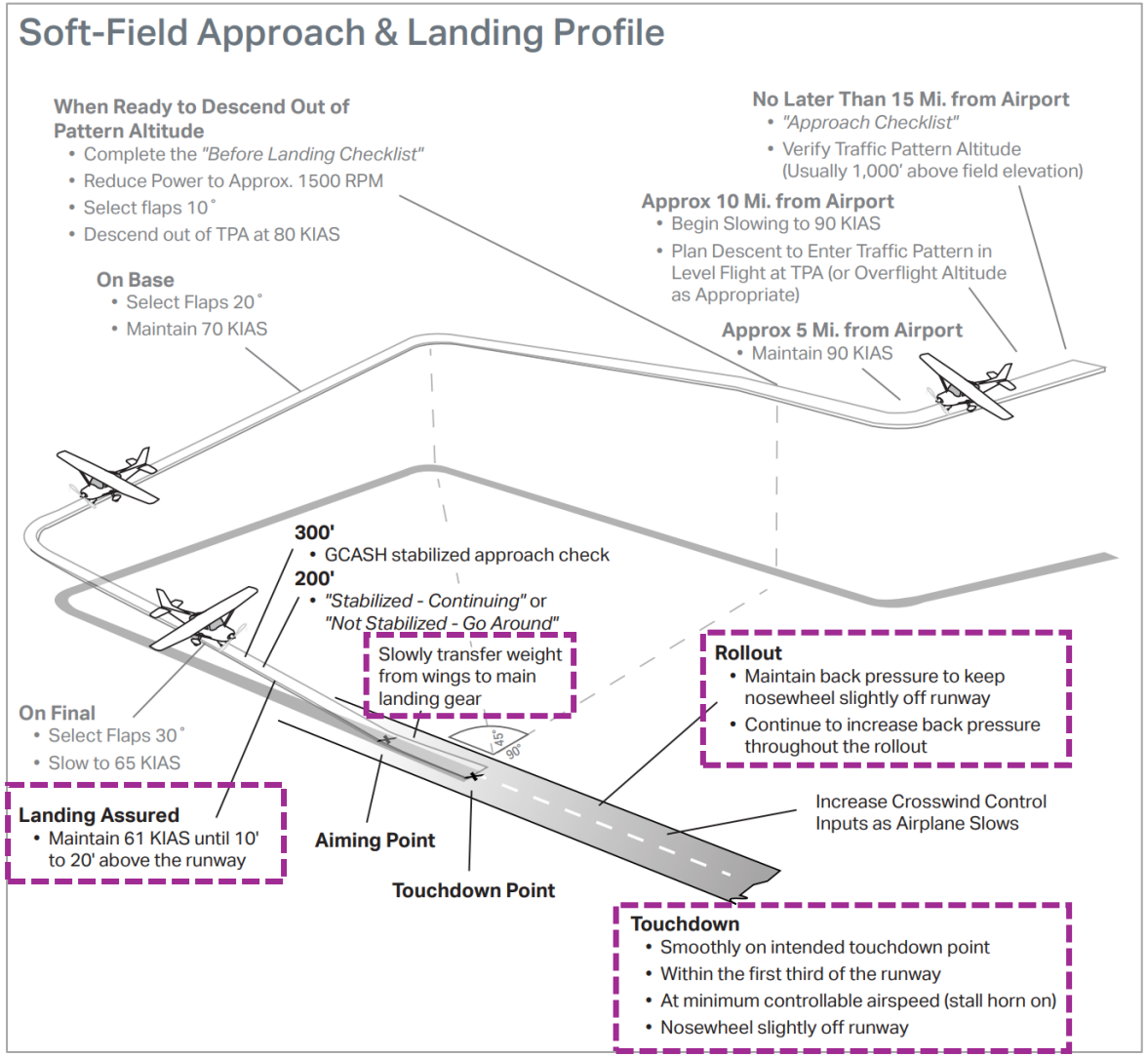
Figure 2-1

NOTE

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

3. Soft-Field Approach and Landing

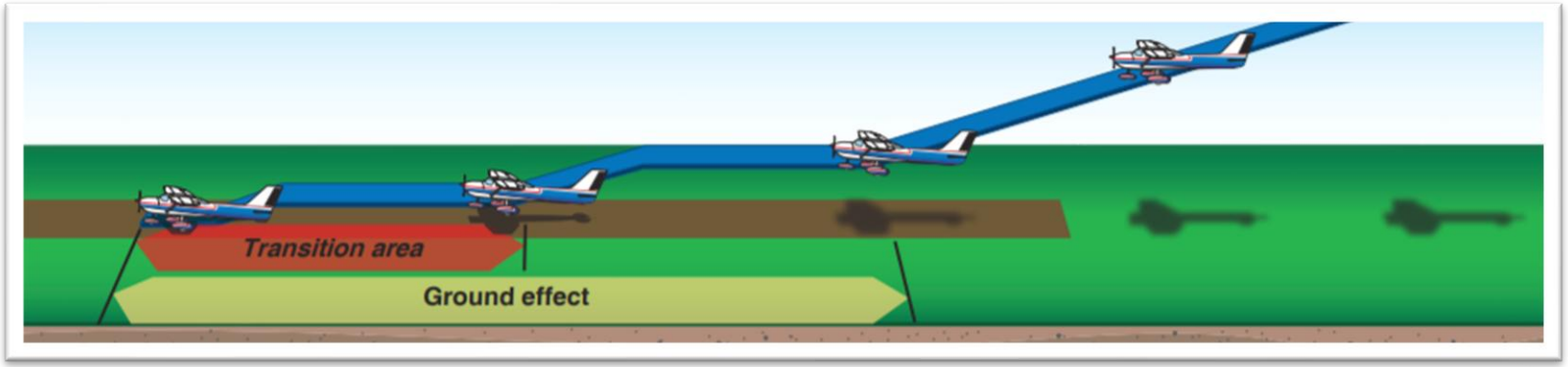
- Slow to **90 kts** prior to entering downwind or traffic pattern
- Enter the traffic pattern at published TPA (typically 1,000' AGL)
- Execute “Before Landing Checklist” at mid-point
- When abeam touchdown point
  - Reduce power (1500 RPM)
  - Flaps 10^0 and initiate descent at **80kts**
- Check for traffic on final, turn base, flaps 20^0, trim for **70kts**
- Turn final, flaps 30^0 and trim to **65kts**
- Slow to **61kts** when landing is assured
- Upon roundout, slowly close throttle and stay in ground effect
- Smoothly let the airplane touchdown at min speed (stall horn)
- Increase back pressure (hold the nose) and keep rolling



4. Soft-Field Landing Considerations

- **Major Differences from a Normal Landing**
  - Airplane is held 1-2’ above the ground, in ground effect, as long as possible
  - Small amount of power is used to cushion the landing
  - After touchdown, keep the nose wheel off the ground
- **Touchdown**
  - Always maintain one hand on the throttle
  - Fly the airplane onto the ground with the weight fully supported by the wings
  - Touchdown at the lowest possible airspeed in a nose-high pitch attitude
  - After main wheel touchdown, maintain back pressure to keep the nose wheel off the ground
  - Once slowed, gently lower the nosewheel to the ground ➔ Avoid braking

- **Crosswind and directional control:** same as normal landing
- **Taxiing**
  - Maintain full aft elevator
  - Maintain enough speed
  - Brake as little as possible

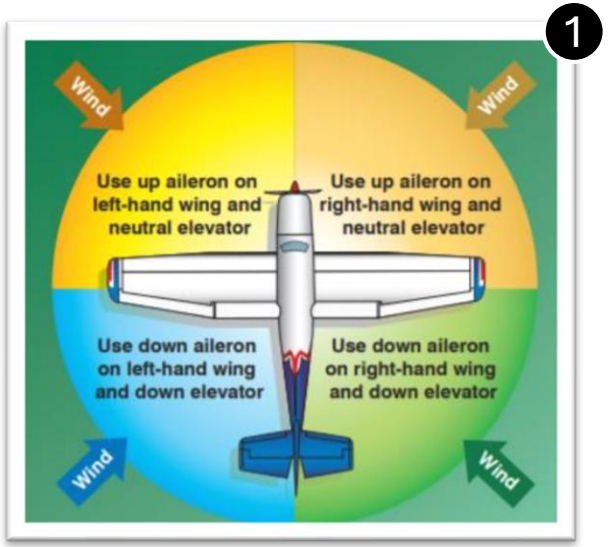


5. Obstructions and Hazards

- **Strong, Gusty Winds**
  - Increase speed on final approach per the manufacturer's guidelines ➔ Usually + half of the gust factor
    - *Example: Winds 8 gusting 20 knots → Gust factor = 12 → Approach airspeed 65 + 12/2 = 71 kts*
  - Use flaps as recommended in the POH → Often best to lands with low flaps (10^0 or 20^0)
- **Obstacles**
  - Powerlines, Trees, towers, construction equipment, birds, animals in the runway, etc.
  - Be aware of potentially hazardous obstructions and ensure airplane performance
- **Traffic**
  - Near airports is where most mid-air collisions happen
  - Be aware of traffic → Particularly in uncontrolled fields
    - Is there an airplane extending upwind or downwind?
    - Any airplane on final? (e.g. in an instrument approach)
    - An aircraft joining the patterns?
    - Is there a helicopter in the pattern?
  - Use radio calls and any other available tools to build a mental picture of traffic

6. Common Errors

1. Improper use of landing performance data and limitations
2. Failure to establish approach and landing configuration at appropriate time or in proper sequence
3. Failure to establish and maintain a stabilized approach
4. Failure to consider the effect of wind and landing surface
5. Improper procedure in use of power, wing flaps, and trim
6. Inappropriate removal of hand from throttle
7. Improper procedure during roundout and touchdown
8. Failure to hold back elevator pressure after touchdown
9. Closing the throttle too soon after touchdown
10. Poor directional control after touchdown [1]
11. Improper use of brakes



[1]

Questions?