



Section/division Air Safety Investigation

Form Number: CA 12-12a

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8417	
Aircraft Registration	ZS-PTB	Date of Accident	5 January 2008		Time of Accident	1215Z
Type of Aircraft	Beech E55		Type of Operation	Private		
Pilot-in-command Licence Type	Private		Age	56	Licence Valid	Yes
Pilot-in-command Flying Experience	Total Flying Hours	1 475.0		Hours on Type	190.2	
Last point of departure	Kitty Hawk Aerodrome (FAKT)					
Next point of intended landing	Ubundu Game Lodge					
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
5m to the right of Runway 35, Ubundu Game Lodge (GPS position: South 24°55.593' East 027°55.693')						
Meteorological Information	Wind reported to be from the west / gusting, Temperature; Hot, Visibility; Good					
Number of people on board	1 + 1	No. of people injured	0	No. of people killed	0	
Synopsis	<p>The pilot, accompanied by a passenger, departed from Kitty Hawk Aerodrome (located to the east of Pretoria) on a private flight to Ubundu Game Lodge, a private game lodge, located near the town of Bela-Bela, about one hour's flight from Kitty Hawk. This was the pilot's first flight to Ubundu Lodge. The pilot followed the unmanned aerodrome approach procedure once overhead and inspected the runway prior to landing. He performed three flights over the runway to ensure that there was no wild life/game on the runway prior to landing. Following inspection of the runway, the pilot elected Runway 35 for landing, which had some trees (approximately 10m or 33 feet in height) in close proximity to the runway threshold. The prevailing wind at the time was reported to be from the west and was gusting, rendering an unstable approach in turbulent conditions. According to the pilot his approach speed was between 100 and 120 knots. On short final approach, he experienced very gusty wind conditions accompanied by a downdraught. As he encountered the downdraught, he immediately applied back-pressure on the control column to address the descent rate, but the right wing dropped and the propeller impacted with an Eskom power line consisting of three conductors. On impact with the wires, the aircraft veered to the right, and according to the pilot was uncontrollable. Following impact, all three conductors were severed, resulting in a power failure in the area. However, the pilot attempted to keep the nose up and steer it to the left with the little rudder authority available. The aircraft impacted with several small trees and shrubs on the right-hand side of the runway where it came to rest approximately 500m past the threshold of Runway 35 in an upright position. Nobody was injured in the accident. The pilot held a valid private pilot's licence. The last MPI inspection that was carried out on the aircraft prior to the accident was certified on 23 April 2007 at 3 020.4 hours.</p>					
Probable Cause						
During the short final approach for landing at an unlicensed private runway, the aircraft collided with power lines and crashed on the right-hand side of the runway.						
IARC Date	Jac.	28 February 2008	Release Date			

AIRCRAFT ACCIDENT REPORT

Name of Owner : Oscar Bravo Papa Vliegtuig CC
Name of the Operator : Private
Manufacturer : Beech Aircraft Corporation
Model : E55
Nationality : South African
Registration Marks : ZS-PTB
Place : Ubundu Lodge
Date : 5 January 2008
Time : 1215Z

All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.

Purpose of the Investigation:

*In terms of Regulation 12.03.1 of the Civil Aviation Regulations (1997) this report was compiled in the interests of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and **not to establish legal liability.***

Disclaimer:

This report is given without prejudice to the rights of the CAA, which are reserved.

1. FACTUAL INFORMATION

1.1 History of Flight:

1.1.1 The pilot, accompanied by a passenger (his wife) departed from Kitty Hawk Aerodrome (located to the east of Pretoria) on a private flight to Ubundu Game Lodge, a private game lodge, located near the town of Bela Bela, about one hour's flight from Kitty Hawk. This was the pilot's first flight to Ubundu Lodge.

1.1.2 Being an unmanned aerodrome, the pilot followed the unmanned aerodrome approach procedure once overhead and inspected the runway prior to landing. He performed three flights over the runway to ensure that there was no wild life/game on the runway prior to landing. The prevailing wind at the time was reported to be

from the west and was gusting, rendering an unstable approach in turbulent conditions.

- 1.1.3 Following inspection of the runway, the pilot elected Runway 35 for landing, which had some trees (approximately 10m or 33 feet in height) in close proximity to the runway threshold. According to the pilot his approach speed was between 100 and 120 knots. On short final approach, he experienced very gusty wind conditions accompanied by a downdraught.
- 1.1.4 As he encountered the downdraught he immediately applied back-pressure on the control column to address the descent rate, but the right wing dropped below the horizontal plane and the propeller impacted with an Eskom power line consisting of three conductors. Following impact all three conductors were severed, resulting in a power failure in the area.
- 1.1.5 Following impact with the wires, the aircraft veered to the right, and according to the pilot was basically uncontrollable. However, the pilot attempted to keep the nose up and steer it to the left with the little available rudder authority. The aircraft impacted with several small trees and shrubs on the right-hand side of the runway where it came to rest, approximately 500m past the threshold of Runway 35 in an upright position.
- 1.1.6 According to the pilot he was not aware of the power lines until seconds prior to impact, when he saw the wires, which were at about the same height as the trees on final approach. He attempted to avoid the power lines, but the right-hand propeller struck the conductors, which were severed, with wire found entangled around the crankshaft flange. Nobody was injured in the accident, which occurred during daylight conditions. The aircraft was, however, extensively damaged.

1.2 Injuries to Persons:

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	1	-	1	-

1.3 Damage to Aircraft:

1.3.1 The aircraft sustained extensive damage when it collided with a power line consisting of three conductors and thereafter it impacted with several trees on the right-hand side of Runway 35.



Figure 1. A view of the wreckage lying on the right-hand side of Runway 35.

1.4 Other Damage:

1.4.1 The aircraft collided with a 10-kilo volt Eskom power line on final approach for landing Runway 35. Following the impact, all three conductors on the line were severed, resulting in a power failure in the area. Eskom maintenance personnel repaired the power line several hours after the accident.



Figure 2. A view of the power lines in question, which were 10m (33 feet) in height.

1.5 Personnel Information:

Nationality	South African	Gender	Male	Age	56
Licence Number	*****	Licence Type	Private		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	30 November 2007				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	1 475.0
Total Past 90 Days	7.0
Total on Type Past 90 Days	7.0
Total on Type	190.2

1.6 Aircraft Information:**Airframe:**

Type	Beech E55	
Serial Number	TE-904	
Manufacturer	Beech Aircraft Corporation	
Year of Manufacture	1973	
Total Airframe Hours (At time of Accident)	3 028.4	
Last MPI (Hours & Date)	3 020.4	23 April 2007
Hours since Last MPI	8.0	
C of A (Issue Date)	20 December 2001	
C of A (Currency Fee Expiry Date)	19 December 2008	
C of R (Issue Date) (Present owner)	6 August 2007	
Operating Categories	Standard	

Engine No. 1

Type	Continental IO-520-C
Serial Number	223158-72-C
Hours since New	3 028.4
Hours since Overhaul	224.3

Engine No. 2

Type	Continental IO-520-C
Serial Number	223129-72-C
Hours since New	3 028.4
Hours since Overhaul	224.3

Propeller No. 1

Type	Hartzell BHC-C2YF-2UF
Serial Number	AN-121
Hours since New	3 918.2
Hours since Overhaul	19.8

Propeller No. 2

Type	Hartzell BHC-C2YF-2UF
Serial Number	AN-119
Hours since New	3 918.2
Hours since Overhaul	19.8

Weight & Balance:

Item	Weight (lbs)
A/C Empty Weight	3 455.0
Pilot (72 kg)	159.0
Passenger (75 kg)	168.0
Luggage (20kg)	44.0
Fuel (300 litres)	474.0
Weight at time of accident	4 300.0

The maximum certified take-off weight (MTOW) for the aircraft is 5 300 pounds or 2 404 kg. The calculated landing weight was found to be 1000 pounds below its MTOW when during approach for landing the aircraft collided with power lines.

1.7 Meteorological Information:

1.7.1 Weather information was obtained from the pilot's questionnaire.

Wind direction	270°	Wind speed	Gusting	Visibility	Good
Temperature	Hot	Cloud cover	No cloud	Cloud base	No cloud
Dew point	Unknown				

1.8 Aids to Navigation:

1.8.1 The aircraft was equipped with standard navigational equipment, which included a panel mounted Garmin XL150 GPS (Global Positioning System).

1.9 Communications:

1.9.1 The pilot broadcasted his intentions on the VHF frequency 124.8MHz prior to landing at Ubundu Lodge on Runway 35, which is a private aerodrome located approximately 35km to the west of the town of Bela-Bela.

1.10 Aerodrome Information:

Aerodrome Location	Ubundu Game Lodge	
Aerodrome Co-ordinates	South 24° 55.485' East 027° 55.629'	
Aerodrome Elevation	3 600 feet AMSL	
Runway Designations	17/35	
Runway Dimensions	1 300m x 30m	
Runway Used	35	
Runway Surface	Grass	
Approach Facilities	None	
Aerodrome Status	Unlicensed (Private)	



Figure 3. A view of the runway taken during the runway inspection on 7 January 2008.



Figure 4. A view of the runway taken in the direction of the threshold of Runway 35.

1.11 Flight Recorders:

1.11.1 The aircraft was not fitted with a Cockpit Voice Recorder (CVR) or a Flight Data Recorder (FDR) and neither was this required by regulations to be fitted to this type of aircraft.

1.12 Wreckage and Impact Information:

1.12.1 The right-hand propeller of the aircraft impacted with three electrical conductors, which were at a height of about 10m or 33 feet AGL (above ground level) and positioned approximately 60m from the threshold of Runway 35. The electrical conductors were approximately at the same height as the surrounding trees on final approach for Runway 35. All three conductors were severed when the aircraft collided with the wires, rendering it basically uncontrollable and as a result the aircraft veered to the right. The aircraft impacted with several small trees and shrubs on the right-hand side of the runway and came to a halt approximately 5m to the right of the runway's edge and approximately 500m past the first point of impact with the electrical conductors. Several metres of the electrical conductor were found entangled around the crankshaft flange on the No. 2 engine. Wire strike markings were clearly visible on the right-hand spinner and the propeller blades.



Figure 5. A view of the impact trajectory of the aircraft on the right-hand side of the runway.



Figure 6. A view of the crankshaft flange with some electrical wire entangled around it.

1.13 Medical and Pathological Information:

1.13.1 The pilot was the holder of a valid aviation medical certificate at the time of the accident.

1.14 Fire:

1.14.1 There was no pre- or post-impact fire.

1.15 Survival Aspects:

1.15.1 Although the aircraft was extensively damaged during the impact sequence, the cockpit/cabin area remained basically intact and this protected the occupants against injury. Both occupants were properly restrained by making use of the aircraft's installed safety harnesses.

1.16 Tests and Research:

1.16.1 None considered necessary.

1.17 Organisational and Management Information:

1.17.1 This was a private flight, with the pilot also being the owner of the aircraft.

1.17.2 The last maintenance inspection that was certified on the aircraft prior to the accident was on 23 April 2007 by Aircraft Maintenance Organisation (AMO) No. 120. The AMO was in possession of a valid AMO Approval that was issued by the CAA at the time of maintenance.

1.18 Additional Information:

1.18.1 Ubundu Lodge Runway:

According to the pilot, as part of his flight planning, he had obtained information on Ubundu Lodge from an information brochure (attached to this report Annexure A), which provided the aerodrome coordinates, elevation, runway orientation and runway length. The brochure made no mention of any hazards, such as power lines on either approach paths (Runway 17 and 35).

The runway at Ubundu Lodge was located on private property, and was not registered or licensed with the CAA (Civil Aviation Authority). Therefore the Civil

Aviation Authority was not responsible for any approval or oversight intervention of the runway or aerodrome facility.

Following notification of the accident on 7 January 2008, a CAA Accident Investigator flew with an Insurance Assessor to the accident site in a Cessna 210. Once overhead the runway, some antelope were observed on the runway, which ran away as the aircraft flew over. Another three orbits were performed to ascertain the prevailing wind conditions and to ensure that the runway was safe/suitable for landing. An uneventful landing was executed on Runway 17 and the aircraft was brought to a halt approximately halfway down the runway. Apart from some small shrubs and trees on the approach for Runway 17, no other obstructions/hazards were noted.

Following a ground inspection of the facility, it was noted that the approach for Runway 35 had some trees ($\pm 10\text{m}$ or 33 feet in height) at approximately the same height as the Eskom power line into which the aircraft had collided. The power line was located approximately 60m from the edge of the threshold (clearway).

The approach for landing Runway 17 was evaluated to be a more safe/suitable option, however, landing on Runway 17 would depend on the prevailing wind at the time, approach angle, type of aircraft, and pilot experience when it comes to landing on bush-type runways.

1.18.2 Cross-wind landings (Refer Annexure B)

1.18.2 Civil Aviation Regulations of 1997.

Part 91.02.8 (Duties of pilot-in-command regarding flight operations):

- (1) The pilot-in-command of an aircraft shall be responsible for –
 - (a) The operation and safety of the aircraft while he or she is in command.

1.19 Useful or Effective Investigation Techniques:

1.19.1 None.

2. ANALYSIS

- 2.1 According to available evidence (aircraft documentation, Flight Folio) there were no pre-impact defect/s or malfunction/s reported that could have contributed to the accident or may have caused it, or were associated with the aircraft prior to, or during the flight to Ubundu Lodge.
- 2.2 The prevailing wind at the time was reported to be from the west and gusting. The pilot did not provide the investigator with any wind speed, or any estimate. It would appear that the wind must have been such that it was assessed to be within his competencies by the pilot, as well as within the cross-wind component limitation of the aircraft, as the pilot continued with the approach to land. Following an inspection of the runway and the prevailing wind, he elected to land in a northerly direction (Runway 35), with a cross-wind component of between 80° to 90° from the left.
- 2.3 The runway was located on a private game lodge and was 1 300 metres in length and about 30m in width. The runway was not registered or licensed with the CAA, therefore unlicensed aerodrome procedures were applicable with the onus being on the pilot to ensure that the operation/flight was safe. As stated in paragraph 1.18.1 of this report, the investigator and insurance assessor flew to the lodge on 7 January 2008 in a Cessna 210, where an uneventful landing and take-off were performed, using Runway 17. It was noted during the field investigation that there were trees in close proximity to the threshold of Runway 35, which would have required a steeper approach angle to ensure sufficient obstacle clearance. The power line that was impacted during the accident, was located about 60m before the threshold and was at about the same height as the surrounding trees. The power line and towers would have been difficult to see, not only from above but also on the approach, with the towers being wooden poles, which blended in with the vegetation and appeared camouflaged against the terrain. The pilot also stated that he had only observed the wires when they were only a few metres in front of him.
- 2.4 This was the pilot's first flight to Ubundu Lodge. Apart from the information that was available to him, which he obtained from the information brochure, he was not familiar with the environment or the airstrip. He did follow the unmanned aerodrome procedure as he joined overhead and conducted several flypasts to inspect and assess his options. The pilot was under no pressure to land as he still

had about 300 litres of fuel in the fuel tanks at the time of the accident. Following his decision to land on Runway 35, he had to contend with the prevailing cross-wind from the left. The approach would have been fairly unstable in these conditions. This is explained by the fact that the aircraft collided with the power lines in a right wing low attitude. The pilot most probably encountered gusts of wind from the left and this could have lifted the left wing as he approached over the trees. It is the writer's opinion that the pilot only noticed the power line in front of him when he was very close to it (a few metres away) and by the time that he initiated avoidance action, he had already collided with the power line, which was impacted by the propeller and severed all three conductors. Once the aircraft had impacted the power line, it veered to the right and became uncontrollable, rendering ground impact inevitable. The aircraft impacted the ground on the right side of the runway, colliding with several small trees and shrubs. Nobody was injured in the accident.

3. CONCLUSION

a) Findings:

- (i) The pilot was the holder of a valid private pilot's licence and had the aircraft type endorsed in his logbook.
- (ii) This was the pilot's first flight to Ubundu Lodge.
- (iii) The aircraft was maintained in accordance with the requirements defined in the applicable CARs and CATS-GMR.
- (iv) According to the available evidence, no pre-impact failure or malfunctions were reported with the aircraft that could have caused or contributed to the accident.
- (v) The prevailing wind at the time was reported to be from the west and was gusting, resulting in a cross-wind landing with the cross-wind from the left.
- (vi) The pilot had the option of either landing on Runway 17 (southerly direction) or Runway 35 (northerly direction) and selected Runway 35 for the landing.
- (vii) The power line in question was spanned diagonally across the approach path of Runway 35 and was approximately 60m from the runway threshold.

- (viii) No hazard identification markers were installed on the power line.
- (ix) The right-hand propeller impacted and severed the power line with clear indentation markings visible on the spinner and blades.
- (x) The aircraft impacted terrain on the right side of Runway 35 and collided with several small trees and shrubs.
- (xi) A substantial amount of electrical wire was found entangled around the crankshaft flange of the No. 2 engine (right hand).
- (xii) Nobody was injured in the accident.

b) Probable Cause/s:

- (i) During the short final approach for landing at an unlicensed private runway, the aircraft collided with power lines and crashed on the right-hand side of the runway.

c) Contributory Factor/s:

- (i) This was the pilot's first visit to the specific aerodrome, rendering him unfamiliar with the environment.
- (ii) He encountered a downdraft on final approach, together with prevailing cross-wind conditions.
- (iii) No hazard identification markers were installed on the power line, located approximately 60m from the threshold of Runway 35.
- (iv) The wires were very difficult to observe on the approach until close proximity to the wires.
- (v) The pilot came in very low and flat on the approach, leaving him very little to no margin for error.

4. SAFETY RECOMMENDATIONS

- 4.1 It is recommended that the owner of Ubundu Lodge, in consultation with Eskom, implement the preventative action by implementing either one of the following safety recommendations in order to prevent a recurrence of this accident:
- (i) Installing clearly visible hazard identification markers to properly mark the electrical conductors on the approach path;
 - (ii) or, alternatively ensure that the power line section in question (entire width of the approach path) be installed underground.
- 4.2 It is recommended that the SACAA: Safety Promotions Department, publish an article in the Safety Link on the risks and hazards associated with flying/operating into unlicensed runways/aerodromes. The AIID had through the years investigated several accidents that occurred either during the landing or take-off phase of flight, and specifically occurring at private game lodges.
- 4.3 It is recommended that the Commissioner reviews the need and effectiveness of introducing regulations requiring the marking of power lines in the vicinity of aerodromes and frequent routes flown.

5. APPENDICES

- 5.1 **Annexure A** (Copy of information brochure pilot used for his flight planning)
- 5.2 **Annexure B** (Cross-Wind Landings)

-END-

Report reviewed and amended by office of the EM: AIID
29 April 2009

ANNEXURE A

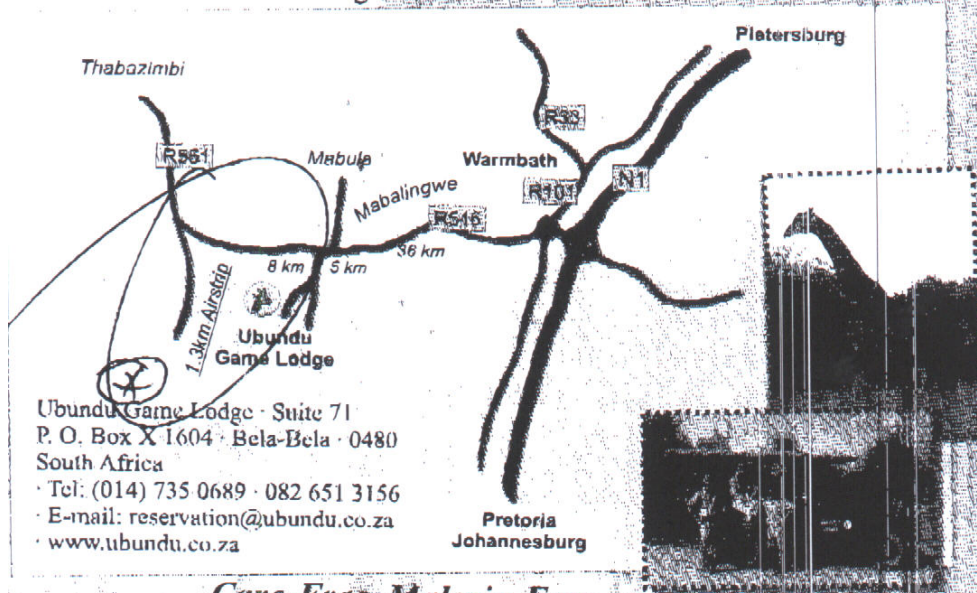


Experience Africa's Great Outdoors...

Enjoy thrilling morning and evening game drives through open bushveld savannah, observing a wide range of antelope, giraffe, zebra and scores of wildlife species unique to Africa's wildest bushveld!

Airstrip Coordinates:

S: 24° 55. 485 Direction: 35/17
 E: 027° 55. 629 Height: 3600 feet



Ubundu Game Lodge · Suite 71
 P. O. Box X 1604 · Bela-Bela · 0480
 South Africa
 · Tel: (014) 735 0689 · 082 651 3156
 · E-mail: reservation@ubundu.co.za
 · www.ubundu.co.za

Pretoria
 Johannesburg

Care-Free, Malaria-Free

ANNEXURE B

Cross-Wind Landings

Reference:

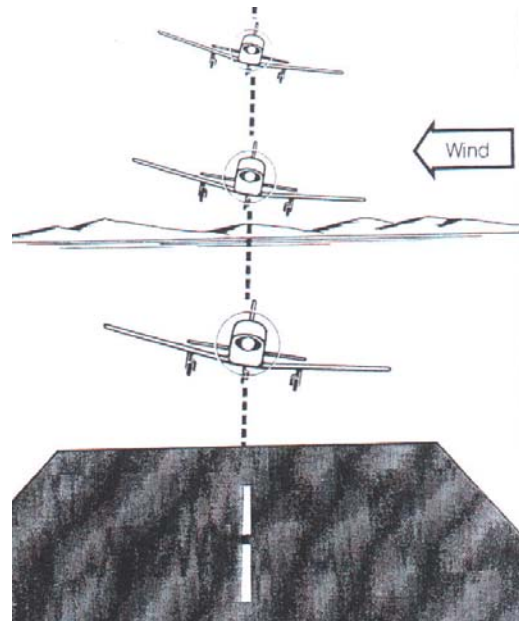
Transport Canada, Flight Training Manual 4th Edition, Chapter 18, Pg.106, 107,108

It is not always possible or practical to land directly into the wind. Consequently, the principles involved in cross-wind landings must be learned and practised until they present no difficulty. A significant change in wind direction is possible between the time an aircraft takes off and the time it lands, even during one circuit, so it is important that you are able to cope with cross-winds.

An aircraft landing directly into wind tends to maintain a straight heading while it is rolling (or about to touch down) on the runway, with minimum control assistance from the pilot. However, in a cross-wind, which is any wind affecting the aircraft at an angle to its longitudinal axis, a more complex situation exist, which if not properly attended to can cause a loss of control. The landing heading of an aircraft is normally determined by the direction in which the runway is orientated, rather than by the actual wind direction. Therefore, an aircraft landing in a cross-wind has the wind striking it from one side or the other while it is in contact with the ground, and due to the aircraft's inherent tendency to weathercock it is being forced off its intended heading. Prior to landing, the aircraft will tend to drift across the runway instead of running true to the centre line. If no corrective action is taken, an undesirable side force is exerted on the landing gear when it touches the surface. The same condition will occur if the path of the aircraft is held true to the centre line, with compensation for drift by crabbing, and the wheels allowed to touch the surface while aligned with the direction of the runway.

Cross-wind landings are somewhat more difficult to manage than cross-wind take-offs. This is mainly due to the difference in the difficulties presented in maintaining control over the aircraft while the speed is decreasing, instead of increasing as in the take-off. During the take-off as the speed of the aircraft increases, aerodynamic control of the aircraft becomes progressively more positive; as the aircraft's speed decreases, before and following touchdown, the effect of this control decreases. Before attempting a landing in a cross-wind other than a very slight one, consult the cross-wind component chart.

There are two basic methods for counteracting drift while executing a cross-wind landing. The first, a side-slip, or wing down method of counteracting drift is probably the most popular of the two basic methods as could be seen in the diagram below.



It affords the important advantage of continuity in flight control positioning, from before touchdown to the end of the landing roll, and will compensate adequately for acceptable cross-winds under most conditions. When using this method, avoid initiating the slip too far back on the final approach, unless there are other reasons for slipping. As you approach the landing area, the drift becomes apparent, side-slip into wind sufficiently to counteract the drift. Keep the longitudinal axis of the aircraft aligned with the centre line of the runway by use of the rudder. On touchdown devote all possible attention to keeping the aircraft rolling in a straight line to forestall any tendency for the aircraft to ground loop. The aileron control should be held toward the upwind wing after touchdown to prevent it from rising.

The second method for eliminating drift when landing in a cross-wind requires considerable skill, excellent timing and great deal of practice. For these reasons it is seldom used in elementary training. With this method the aircraft is maintained on a heading (crabbed) into the wind so that the flight path of the aircraft is aligned with the runway centre line. This means that the longitudinal axis of the aircraft is not aligned with the intended landing path and if contact with the surface is allowed in this condition, there is a risk of damaging the landing gear or subsequent difficulty in controlling the aircraft. Therefore, just prior to touchdown the longitudinal axis of the aircraft must be lined up with the runway by use of rudder. This method

requires prompt and accurate rudder action to line up the aircraft exactly with its direction of travel over the ground at the instant of contact. If contact is made too soon the aircraft will land with crab; if contact is too late, it will land with drift. Either will impose side-loads on the landing gear and impart ground-looping tendencies. As well, as the upwind wing has been lowered into the wind, a gust at the wrong moment can easily lift it and aggravate the tendency to ground-loop.