

ACCIDENT

Aircraft Type and Registration:	Bolkow Bo 209 Monsun, G-AZRA	
No & Type of Engines:	1 Lycoming O-320-E2F piston engine	
Year of Manufacture:	1972	
Date & Time (UTC):	20 October 2005 at 1150 hrs	
Location:	Private airstrip, near Miserden, Gloucester	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Dented spinner, fibre glass cowling cracked, wing leading edge dented	
Commander's Licence:	Private Pilot's Licence with IMC rating	
Commander's Age:	29 years	
Commander's Flying Experience:	264 hours (of which 149 were on type) Last 90 days - 19 hours Last 28 days - 6 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

The pilot was returning to his private airstrip, having previously flown from High Wycombe to nearby Rendcombe, a grass strip 550 m in length. The airstrip has two landing areas, 04/22 which is 450 m long and has a downslope of 1:18 (5.5%) in the 22 direction and 13/31, which is 390 m long, is level and has a 15 ft high fence close to its 13 threshold. There is no windsock at the airstrip.

When he arrived overhead, the pilot listened to the Kemble radio frequency which was reporting a wind of 230°/11 kt; Kemble is approximately 6nm from the airstrip. The pilot concluded that he would have a tailwind of approximately 11 kt if he landed down the slope of the longer runway and an 11 kt crosswind using the shorter runway. He had used both landing directions

several times before and, on this occasion, selected landing direction 13 for his landing. Passing over the hedge, the aircraft touched down approximately 80 m beyond the threshold, which left approximately 300 m for the landing roll in which to stop.

The pilot initiated firm braking, but the wheels locked and slid on the wet grass, which resulted in little deceleration. He then pumped the brakes on and off, with little effect and, with 100 m of runway remaining and the aircraft still travelling at 40 to 45 mph, he applied full left rudder to prevent a collision with a stone wall at the end of the runway. The aircraft deviated to the left, whilst sliding to its right, before it hit a post and wire fence in the corner of the field. The pilot pulled the mixture control to idle cut-off before the collision.

Many light aircraft are in performance group E, and certificated with unfactored data¹. The owners manual for this aircraft type indicates that a landing distance of approximately 440 m is required from a height of 50 ft on approach, which includes a ground roll of approximately 240 m. These figures assume that the landing is being made on a dry hard surface, at an elevation of approximately 500 ft amsl, at standard atmospheric temperature and pressure and with a zero headwind component. They are derived from measured data, and are usually produced using a new aircraft, in ideal conditions and flown by a highly experienced pilot. The manual states that the landing distance should be increased by 10% on a grass surfaces, but it also states that the landing roll can be much greater on grass runways, especially when wet.

The UK CAA publishes a very useful guide for light aircraft short field operations. The incorporated data, derived from practical testing, is published as an Aeronautical Information Circular (AIC) and is currently also available as Safety-Sense Leaflet (SSL) No. 7c, titled *Aeroplane Performance* dated June 2005. This provides factors to be applied to (unfactored) data in the manual for non-standard runway conditions, ie, grass surfaces, slopes, tailwind component, etc. With

reference to page 6 of SSL 7C, Figure 1, where dry grass of up to 20 cm (8 in)² height on firm soil constitutes the surface, the required landing distance (from 50 ft) should be increased by 15%. If the grass is wet the relevant increase is 35% and should the grass be very short and wet, 60% is indicated. SSL 7c also advises that an additional overall safety factor of 1.43 should be applied to unfactored data, once the landing distance has been derived by applying individual factors to data in the manual, and that all factors are cumulative and should be multiplied together.

The effect of variables of pilot technique, the uncertainty of the value of headwind or tailwind component (because the only data available to the pilot was an estimated cross-wind based on a measured figure of strength and direction broadcast from a location some distance away) and the state of the landing surface (wet grass) conspired, on this occasion, to render landing direction 13 unsuitable for the aircraft to perform a successful landing.

When planning to land at an airfield under limiting conditions, it is vital to ascertain the weather conditions, the state of the runways and apply the factors as described in SSL 7c.

Footnote

¹ Unfactored data relates to the actual performance of an aircraft when flown and measured under ideal conditions.

Footnote

² The length of the grass on Runway 13 was reported as three to four inches.

10 SUMMARY:

FACTORS MUST BE MULTIPLIED i.e. 1.20 x 1.35				
CONDITION	TAKE-OFF		LANDING	
	INCREASE IN TAKE -OFF DISTANCE TO HEIGHT 50 FEET	FACTOR	INCREASE IN LANDING DISTANCE FROM 50 FEET	FACTOR
A 10% increase in aeroplane weight, e.g. another passenger	20%	1.20	10%	1.10
An increase of 1,000 ft in aerodrome elevation	10%	1.10	5%	1.05
An increase of 10°C in ambient temperature	10%	1.10	5%	1.05
Dry grass* - Up to 20 cm (8 in) (on firm soil)	20%	1.20	15% ⁺	1.15
Wet grass* - Up to 20 cm (8 in) (on firm soil)	30%	1.3	35% ⁺ Very short grass may be slippery, distances may increase by up to 60%	1.35
Wet paved surface	-	-	15%	1.15
A 2% slope*	Uphill 10%	1.10	Downhill 10%	1.10
A tailwind component of 10% of lift-off speed	20%	1.20	20%	1.20
Soft ground or snow*	25% or more	1.25 +	25% ⁺ or more	1.25 +
NOW USE ADDITIONAL SAFETY FACTORS (if data is unfactored)		1.33		1.43

Notes:

- * Effect on Ground Run/ Roll will be greater.
- ⁺ For a few types of aeroplane e. g. those without brakes, grass surfaces may decrease the landing roll. However, to be on the safe side, assume the INCREASE shown until you are thoroughly conversant with the aeroplane type.
- Any deviation from normal operating techniques is likely to result in an increased distance.

If the distance required exceeds the distance available, changes will HAVE to be made.

SSL 7c 6 June 2005

Figure 1

Extract from Safety Sense Leaflet 7c (June 2005)