

# Piel CP328 Super Emeraude, G-BPRT

## AAIB Bulletin No: 2/98 Ref: EW/C97/8/5 Category: 1.3

<b>Aircraft Type and Registration:</b>	Piel CP328 Super Emeraude, G-BPRT
<b>No &amp; Type of Engines:</b>	1 Lycoming O-235 piston engine
<b>Year of Manufacture:</b>	1990
<b>Date &amp; Time (UTC):</b>	9 August 1997 at 1653 hrs
<b>Location:</b>	Lumb Rossendale Airstrip, Rawtenstall, Lancashire
<b>Type of Flight:</b>	Private
<b>Persons on Board:</b>	Crew - 1 - Passengers - 1
<b>Injuries:</b>	Crew - Serious - Passengers - Serious
<b>Nature of Damage:</b>	Aircraft destroyed
<b>Commander's Licence:</b>	Private Pilot's Licence
<b>Commander's Age:</b>	62 years
<b>Commander's Flying Experience:</b>	520 hours (of which 470 were on type) Last 90 days - 27 hours Last 28 days - 9 hours
<b>Information Source:</b>	AAIB Field Investigation

## History of the flight

The pilot gained his Private Pilot's Licence in 1992. Since that time, the majority of his flying experience has been gained on the aircraft involved in this accident. The aircraft was normally based at Netherthorpe Airfield and had regularly and successfully operated from there on the grass Runway 24, which has a take-off run available of 488 metres and a 1.9% upslope.

On the morning of the accident, the pilot telephoned the owner of the grass landing strip at Lumb Rossendale in order to seek prior permission to visit the strip on a pleasure flight. This permission was granted. The aircraft departed from Netherthorpe at 1219 hrs with about three quarters full fuel contents in both the front and rear fuel tanks, a total of around 90 litres. The flight time to Lumb Rossendale was 37 minutes and the aircraft made an uneventful approach and landing into the prevailing wind (which the pilot estimated to be about 300° at 12 to 15 kt) on Runway 30. After

landing, the aircraft taxied and parked outside one of the hangars, located on the north east-side of the strip. The pilot was accompanied on the flight by his wife.

The landing strip at Lumb Rossendale is oriented 12/30. The usable section of the field is 400 metres long by 18 metres wide, elevation 925 feet amsl. It slopes uphill in the Runway 30 direction. The average gradient estimated by the AAIB was about 2.5%, but with an increase in slope to about 5% at the south-eastern end of the field (not generally considered to be part of the active runway surface). There is a level plateau about half way along the strip.

About one hour after arrival, the pilot and passenger reboarded the aircraft for the return flight to Netherthorpe. During the intervening period, the pilot had observed a locally based Jodel 120 aircraft with two people on board depart into wind from Runway 30. Later information indicated that the Jodel had made four uneventful flights that day using Runway 30.

The pilot of the Emeraude also elected to use Runway 30. Full power was applied for take off with half flap set. According to the pilot, the aircraft normally lifted off at about 50 kt but on this occasion, with an airspeed of about 40 kt, the aircraft bounced and became airborne briefly but sank back onto the surface. The pilot decided to abandon the take off and the aircraft was brought to a halt before the end of the runway. The aircraft was taxied back to the previous parking area and he decided to wait until the wind had reduced before making an attempt to depart on Runway 12 in order to take advantage of the downhill slope. During the intervening period, the pilot also off-loaded some 22 litres of fuel (to be half full in both tanks) in order to reduce the aircraft's take-off weight.

The aircraft taxied once again at about 1653 hrs, by which time the wind had dropped to an estimated 300° at 5 kt (a 5 kt tailwind component on Runway 12). After an engine run up and pre-take-off checks, the aircraft commenced its take-off roll on Runway 12. The pilot noted that half flap was set and the engine was achieving around 2,200 RPM. At about 40 kt, the aircraft seemed to stop accelerating but was not yet ready to become airborne. It bounced over rough ground but settled back again each time. It got to the point where the pilot realised that it was not going to get airborne, so he pulled the stick back and closed the throttle as the aircraft reached the end of the strip.

The owner of the strip and the pilot of the Jodel were watching the take-off run from the hangar area. They noted that as the aircraft passed them, the tail was still on the ground. The tail then lifted slightly but the aircraft pitched up markedly as it reached the end of the strip. The left wing then dropped before the aircraft collided with farm buildings and equipment located at the end of the strip. The two men ran over to the wreckage to release the occupants and arranged for the prompt attendance of the emergency services. Both occupants received serious impact injuries and were taken to hospital.

An aftercast from the Meteorological Office indicated that, at the time of the accident, the sea level surface wind was from 250°T to 280°T at 3 to 7 kt and the wind at 2,000 feet altitude was from 290°T at 10 kt. The visibility was over 10 km with no significant weather or cloud. The surface temperature was about 23°C and the mean sea level pressure was 1019 mb.

### **Engineering inspection**

The aircraft came to rest amongst farm buildings beyond the south-eastern end of the strip, having struck part of a fence and a post, a stationary tractor and a number of stone, concrete and steel

objects and structures. The aircraft structure was effectively destroyed by the series of impacts. Debris from the wooden propeller was scattered along the trail between the fence/gate area and the final impact point, suggesting that considerable engine rotational energy was present up to the region of the final impact point. There was no fire. Both of the occupants' full harnesses held during the impact.

### **Performance considerations**

The CAA Aeronautical Information Circular (AIC) 12/1996, entitled Take off, Climb and Landing Performance of Light Aeroplanes, details the considerations involved in calculating safe take-off performance criteria when not operating from a level, hard, dry runway at standard sea level ambient conditions. It itemises the effects on take-off distance of aircraft weight, airfield altitude, ambient temperature, tailwind and surface type which would have affected this take off.

It notes that dry grass up to eight inches long on firm soil increases the take-off distance by 20%, the most significant effect being upon the take off-roll. It also advises that take-off should not be attempted if grass is more than 10 inches high.

Other relevant factors include increments in take-off distance of 20% for a 10% increase in aircraft weight, 20% for a tailwind component of 10% of the lift-off speed, 10% per 1,000 feet of airfield pressure altitude and 10% per 10°C increase in ambient temperature above standard. When two or more of these factors are present their effects must be multiplied together to calculate the required take-off distance. After calculating these, a safety factor of 1.3 is recommended.

The Pilots Operating Handbook for this type indicates that the 'standard' take-off run required is 230 metres. Factoring this in accordance with AIC 12/1996 gives a take-off run required of 400 metres before the application of the safety factor.

Visual inspection by the AAIB showed that the grass length varied considerably along the length of the strip, being generally in the range from 1 to 6 inches with variable density of grass and some clumps. The advice contained in the CAA General Aviation Safety Sense leaflet 12B 'Strip Sense' indicates that a good rule of thumb for take-off assessment is that the grass length should be no more than 30% of the aircraft's wheel diameter (G-BPRT wheel diameter 16 inches, 30% of this being 4.8 inches).

The estimated take-off weight of the aircraft was 1,287 lb. The maximum allowable take-off weight was 1,500 lb. The stall speed at this weight was placarded as 52 kt flaps up and 47 kt with full flap.