

## ACCIDENT

<b>Aircraft Type and Registration:</b>	Piper PA-32R-301T Saratoga, N517FD	
<b>No &amp; Type of Engines:</b>	1 Lycoming T10-540 SER Piston Engine	
<b>Year of Manufacture:</b>	2001 (Serial no: 3257263)	
<b>Date &amp; Time (UTC):</b>	16 May 2018 at 1026 hrs	
<b>Location:</b>	Fair Isle Airfield, Shetland Islands	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - 5
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	Right main landing gear partially collapsed, right stabilator bent and damage to lower rear fuselage	
<b>Commander's Licence:</b>	Commercial Pilot's Licence	
<b>Commander's Age:</b>	64 years	
<b>Commander's Flying Experience:</b>	3,372 hours (of which 2,270 were on type) Last 90 days - 90 hours Last 28 days - 50 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot	

## Synopsis

Windshear was experienced on short final at Fair Isle Airfield and, consequently, the aircraft's speed at touchdown was faster than intended. The landing roll continued to the upwind end of the runway, where the pilot attempted a 180° turn but he encountered loose gravel and a sloping surface. The aircraft slid sideways off the prepared surface at low speed, and the right main landing gear partially collapsed, while the right stabilator and the rear fuselage struck the ground.

## History of the flight

The aircraft departed Retford/Gamston Airfield, at close to maximum takeoff weight, and was flown approximately 400 nm north, in good weather conditions, to Fair Isle, a small island situated between the Orkney and Shetland islands. The pilot was familiar with the airfield at Fair Isle, where the single gravel runway is orientated 06/24 and slopes up from both thresholds towards the midpoint.

The wind was from 330° at 15 kt and the pilot elected to land on Runway 24, because the surrounding land on the east side lies below the level of the runway threshold. With no obstructions on the approach, he was confident that he could touchdown "on the numbers" and close to the start of the available landing distance of 486 m. The Pilots Operating Handbook (POH) informed the pilot that the required landing ground roll, for a level, paved

runway, was 210 m and, from his own previous experience of this airfield, he expected to halt the aircraft comfortably on its gravel surface using less than 400 m. He also expected there to be an element of headwind when approaching from the east, due to the wind flowing around high ground north of the airfield, and he believed this, along with the upslope on the first part of the runway, would lead to effective deceleration.

Following a picturesque flight north, the pilot felt relaxed as he began his approach; he anticipated a routine landing and a pleasant visit to the island. There was a steady crosswind from his right for most of the approach and the pilot stated this was “perfectly manageable” but, near the threshold, he experienced a sudden windshear, which created a large updraught and a noticeable headwind. This caused the aircraft to “balloon”, so the pilot reduced power and re-established his approach path. However, he then experienced a reduction in the headwind and a strong downdraught, which caused the aircraft to descend to below the elevation of the threshold and he had to apply a large amount of power to regain altitude. As he flew out of the downdraught, the pilot was aware the aircraft was accelerating but his focus was on achieving a touchdown near his aiming point, and this he achieved.

The touchdown felt normal, so the pilot raised the flaps and applied normal braking while the aircraft ran up the slope towards the middle of the runway. At this stage, he realised that his groundspeed was significantly greater than intended and he briefly considered taking off again, but decided that he was still on a good braking surface and that he could complete the landing by using more of the runway length than he had during past visits. However, he had overlooked the downslope to the upwind threshold and this prevented him from slowing the aircraft to a stop. Nevertheless, he believed he could safely turnaround at the end of the runway and he moved the aircraft right before initiating a left turn. He then noticed that he was running over loose gravel and, after turning through 90°, the aircraft started to slide downhill to the right.

The aircraft slowly slid off the prepared surface before coming to rest on the adjacent rough ground, with the right main landing gear partially collapsed and the right rear fuselage resting on the ground. None of the occupants were injured and they were able to disembark normally. There was no evidence that the right wing had touched the surface but the rear horizontal tailplane, the stabilator, had been bent by ground contact (Figure 1).

### **Pilot’s assessment**

The pilot observed that the accident was caused by unexpected windshear but realised that he could have overcome this by going around. He noted that he was probably “lulled into a false sense of security”, after a relaxing transit in good weather, to a destination he was familiar with and where he had encountered no previous problems. He believes that, had he been more alert to what was happening, he would have gone around, either when he encountered the updraught or certainly after experiencing the downdraught. By that stage he was too focused on achieving a touchdown at the correct point, and so did not assimilate the extra speed which the aircraft had gained. Finally, had he anticipated the effect of the downslope along the second half of the runway, he believes that he would have elected to take off again, when he noticed the high groundspeed.



**Figure 1**

N517FD after being moved to a parking area and with the right stabilator bent upwards  
(Picture used with permission)

### **AAIB comment**

In his planning for this flight the pilot referred only to the POH performance graph for the landing ground roll, because he knew the local topography and was convinced he could touchdown at the landing threshold. Also, he had landed at this airfield before and he believed there was ample landing distance available. However, the POH also provides performance graphs for the landing distance required from a height of 50 ft above the threshold, which the pilot disregarded because he would be approaching over a valley with no obstacles. Had he referred to this graph, it would have given him a required landing distance of approximately 500 m; greater than the landing distance available on Runway 24.

Advice on the calculation of takeoff and landing distances is provided in the UK Aeronautical Information Circular (AIC) 127/2006 '*Take Off, Climb and Landing Performance of Light Aeroplanes*' and information from this is also included in the CAA's '*Skyway Code*' and in its Safety Sense Leaflet 7c '*Aeroplane Performance*'. As well as suggesting factors to apply to the figures obtained from performance graphs, to allow for variables such as runway surface and condition, the AIC advocates that a further safety factor of 43% be included in landing calculations. The AIC states:

*'The pilot should always ensure that after applying all the relevant factors including the safety factor the landing distance required from a height of 50ft does not exceed landing distance available.'*

In this case, the safety factor of 43% would have increased the required landing distance to 718 m, from a height of 50 ft above the threshold. This might appear excessively pessimistic for a runway with no physical obstructions along its approach path but, as this accident illustrates, other variables can substantially increase the unfactored distances obtained from the POH.