

SERIOUS INCIDENT

Aircraft Type and Registration:	DHC-6 Series 310 (Twin Otter), G-CBML	
No & Type of Engines:	2 Pratt & Whitney Canada PT6A-27 turboprop engines	
Year of Manufacture:	1980 (Serial no: 695)	
Date & Time (UTC):	13 March 2023 at 1535 hrs	
Location:	St Mary's Airport, Isles of Scilly	
Type of Flight:	Commercial Air Transport (Passenger)	
Persons on Board:	Crew - 2	Passengers - 15
Injuries:	Crew - None	Passengers - None
Nature of Damage:	None	
Commander's Licence:	Commercial Pilot's Licence	
Commander's Age:	63 years	
Commander's Flying Experience:	9,700 hours (of which 5,000 were on type) Last 90 days - 67 hours Last 28 days - 21 hours	
Information Source:	Aircraft Accident Report Form submitted by the commander and further enquiries conducted by the AAIB	

Synopsis

Whilst landing in gusty crosswind conditions the commander was unable to keep the aircraft on the paved surface so elected to go around. The aircraft travelled approximately 12 m across adjacent grass before getting airborne again. No damage was caused to the aircraft.

History of the flight

The Twin Otter was undertaking a scheduled flight from Land's End Airport to St Mary's Airport in the Isles of Scilly. Several flights had been cancelled earlier in the day due to the strong winds at St Mary's. By the early afternoon reports indicated the wind had reduced slightly with the 1450 hrs METAR giving the surface wind from 220° at 22 kt. As this was now within the aircraft limits the commander decided it was safe to undertake the flight. The aircraft departed Land's End Airport at 1510 hrs.

The commander made a visual approach to Runway 27 at St Mary's, electing to land with full flap. When the aircraft was cleared to land, ATC reported the surface wind as "210° at 19 kt, maximum 27 kt". As the aircraft approached the runway ATC gave an instant wind check of "210° at 20 kt". The aircraft touching down at 1534 hrs.

The commander reported that the initial touchdown was smooth but slightly further down the runway than ideal due to the aircraft floating slightly. Once all three wheels were on the

ground, he was about to select reverse when the right wing started to lift. He recalled that he reduced the in-to-wind aileron to lower the right wing but the left wing then “rose quite violently and the aircraft started to veer to the left, weathercocking into wind, now only on the nose and right main wheels”. The commander reported that he was unable to lower the left wing or stop the aircraft drifting to the left. As the aircraft approached the edge of the runway he decided to go around and applied full power. The co-pilot selected Flap 10.

The co-pilot’s recollection was that the approach was stable and the initial touchdown was normal but the aircraft then started to “wheelbarrow on two wheels and pull to the left”. At this time he had the sense that the right wing was lifting. He recalled checking the control column and seeing the ailerons were around the neutral position. As the aircraft left the paved surface he recalled the commander calling “going around” and applying full power, and he instinctively selected Flap 10.

The aircraft travelled across the grass to the left of the runway before becoming airborne. Once airborne it accelerated in ground effect as the flaps retracted and was then able to climb away. Once level the flight crew discussed returning to the mainland but decided to make a second approach. The second visual approach was uneventful, and the aircraft landed without further incident at 1539 hrs.

Inspection after landing revealed no damage to the aircraft. Tyre marks were found leaving the runway just past the runway intersection and extending approximately 12 m onto the grass (Figure 1).

It was stated in the commander’s and ATC report that two local pilots witnessed the incident and reported that at the time of landing there were two significant gusts of wind punctuated by a short lull.

Aerodrome information

St Mary’s Airport has two runways, 14/32 and 09/27, as shown in Figure 2. Runway 27 is 522 m long and 18 m wide and has a declared LDA of 501 m. The AIP¹ contains the following warning:

‘Pilots should exercise extreme caution when landing and taking-off at this aerodrome, which is markedly hump-backed. The gradients increase to as much as 1 in 13 at the runway ends.

Turbulence and/or windshear may affect the final half mile of approaches to all runways and may be increased by valley effect and/or structures when using Runways 09, 14 or 27.’

Footnote

¹ AIP – Aeronautical Information Publication, available at <https://nats-uk.ead-it.com/cms-nats/opencms/en/Publications/AIP/> [accessed 3 June 2023].



Figure 1

Tyre marks found on Runway 27 leaving the runway to the left



Figure 2

Aerial view of St Mary's Airport showing where the aircraft departed the runway (for orientation the yellow markings seen in Figure 1 can be seen in this view to the right of the point the aircraft left the paved surface)

Aircraft performance

The company crosswind limit for the Twin Otter is 27 kt on a dry or wet runway. The company's operations manual specifies lower limits for commanders with less than 150 hours P1 on type, for co-pilots and for night landing at St Mary's.

The manual states '*if a significant cross wind is unavoidable consideration to using flap 20 for landing should be made if the runway is of suitable length*'. The manual requires full flap to be used for landing on Runway 27 at St Mary's if the headwind component is less than 12 kt.

Meteorology

The METAR issued at 1520 hrs gave a surface wind from 220° at 22 kt, visibility 8 km, cloud few at 1,400 ft, temperature 12°C, dewpoint 9°C and a sea level pressure of 987 hPa. The runway conditions were wet/wet/wet (condition code 5/5/5).

The full requirements for meteorological observations at aerodromes are specified in CAP 746². Reported surface wind direction and speed is the average taken over a ten minute period immediately preceding the time of the observation. A gust is only reported if, within that period, the wind exceeds the mean wind speed by 10 kt or more. The wind direction is referenced to True North. When ATC reports the wind to aircraft for takeoff and landing, the direction is expressed in degrees Magnetic and the reading is averaged over the previous two minutes. Gusts are still reported if the wind exceeds the mean wind speed by 10 kt or more in the last 10 minutes. Variations in wind direction is reported when the total variation in direction over the previous ten-minute period is 60° or more.

Flight crew

The commander had a total of 9,700 hours flying experience including 5,000 hours on the Twin Otter. He was a training captain for the operator and held Class Rating Instructor and Examiner (CRI/CRE) ratings.

The co-pilot had a total of 1,300 hours including 1,000 hours on the Twin Otter.

Organisational information

The operator had identified the risk of a runway excursion at St Mary's due to the narrow and short runway within their Safety Management System. It had put the following mitigations in place to manage the risk:

- '*SOPs contain specific weather limits for St Mary's for pilots of limited experience.*

Footnote

² CAP746 – '*Requirements for meteorological observations at aerodromes*' available at <https://www.caa.co.uk/> [accessed 3 June 2023].

- *SOPs state pilots in command have to be checked out with a base trainer before taking off or landing at St Mary's.*
- *ATC report mean and max wind on R/T to better estimate max cross-wind.*
- *SOPs state approach must be stabilised to continue to land.*
- *Maximum reduced cross wind at night introduced.*
- *No pilot can land or depart St Mary's without prior circuit training by a CRE/ CRI.'*

The operator stated that prior to this occurrence these mitigations had been effective.

Following the operator's review of this incident, it intends to display a live wind plot in the Land's End crew room, provided by the Met Office, which shows the surface wind direction and strength for St Mary's for the last 30 minutes. It is intended that this will give flight crew a better understanding of the frequency of wind gusts before they depart. It will also display a live web cam from St Marys to give a view of the weather conditions.

The chief pilot is also considering if the 12 kt headwind requirement for using Flap 20 may be reduced for aircraft below maximum landing weight. It is intended that this may allow greater use of Flap 20 in crosswind conditions. This would not have helped in this incident as the aircraft was close to the maximum landing weight.

Analysis

As the aircraft approached Runway 27, ATC reports suggest there was a headwind component of approximately 10 - 15 kt and a crosswind component from the left of approximately 16 – 23 kt.

It is likely that as the aircraft touched down it experienced a lull in the wind which meant the commander had too much in-to-wind aileron at that moment. However, as he reduced the aileron, the wind increased, such that he then had insufficient aileron to keep the wings level. As the airspeed decreased and the flight controls became less effective the commander was unable to keep the aircraft on the runway.

The co-pilot recalled seeing the ailerons around the neutral position after landing so it is also possible that the commander reduced the in-to-wind aileron too much on landing and this caused the right roll.

The commander's quick actions to initiate a go-around avoided the consequences of any further ground excursion. Landing with Flap 20 may have made it easier to manage the crosswind, but, with possibly only 10 kt of headwind the commander considered full flap was required to ensure the aircraft would stop within the runway distance available.

ATC is only required to report gusts if the wind speed exceeds the average by 10 kt or more in the preceding ten minutes. This can mean that there are significant variations in the wind which are not reported. ATCOs can provide maximum wind or instant wind, as

they did at St Mary's, if they consider this would assist the pilots. This information can also be requested from ATC.

The operator has provided additional live wind information to their pilots in their crew room to give a better indication of the frequency and intensity of gusts over the previous 30 minutes. It is thought this will assist its pilots by giving them more knowledge about the wind conditions they are likely to experience in St Mary's.

Conclusion

It is likely that the combination of the gusting wind and the amount of in-to-wind aileron applied caused the aircraft to roll right and weathercock into wind. This caused the aircraft to veer left and leave the paved surface. The commander's decision to go around prevented a more serious outcome.