

**SERIOUS INCIDENT**

<b>Aircraft Type and Registration:</b>	ATR 72-211, G-CLNK	
<b>No &amp; Type of Engines:</b>	2 Pratt & Whitney Canada PW121 turboprop engines	
<b>Year of Manufacture:</b>	1989 (Serial no: 147)	
<b>Date &amp; Time (UTC):</b>	25 October 2022 at 2030 hrs	
<b>Location:</b>	East Midlands Airport	
<b>Type of Flight:</b>	Cargo	
<b>Persons on Board:</b>	Crew - 3	Passengers - None
<b>Injuries:</b>	Crew - None	Passengers - N/A
<b>Nature of Damage:</b>	Damage to nosewheel tyre	
<b>Commander's Licence:</b>	Airline Transport Pilot's Licence	
<b>Commander's Age:</b>	61 years	
<b>Commander's Flying Experience:</b>	11,011 hours (of which 63 hours were on type) Last 90 days - 63 hours Last 28 days - 3 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot	

**Synopsis**

After landing in a light crosswind, as the aircraft decelerated through 80 kt, it swerved right and hit a runway edge light, damaging the nosewheel tyre. The operator has taken action to address aircraft handling during the ground roll in crosswinds.

**History of the flight**

G-CLNK was operating from Jersey Airport to East Midlands Airport and made a radar vectored autopilot coupled approach to Runway 09. During the approach, the reported wind at the airport obtained by the pilots was from 150° at 10 kt. The commander was PF. He stabilised the approach by 1,000 ft and then established the aircraft with a slight crab into wind and power set at 25% torque. In the latter stages of the approach the commander disconnected the autopilot, removed the small amount of crab in the flare and touched down aligned with the runway. Once all wheels were on the runway, he selected ground idle and, as the aircraft continued to decelerate along the runway, it began to swerve to the right. He handed control to the co-pilot and applied left nosewheel tiller to straighten the aircraft. The commander noticed that the right wing lifted, which he ascribed to the turn to the right in combination with the crosswind from the right. The commander then applied more tiller input to the left, aided by the application of left pedal and differential left brake input by the co-pilot, to which the aircraft slowly began to respond.

During the landing roll the commander reported seeing an object on the runway ahead and to the left. Review of the CCTV subsequently showed a 'spark' under the aircraft during the landing roll.

The METAR for the airport valid at the time of landing reported wind from 140° at 12 kt.

The commander reported the excursion to ATC, and a runway inspection was carried out which reported a broken edge light. An engineering inspection found damage to the tyre of the nosewheel, which was replaced.

## Personnel

The commander was experienced and who had recently completed his type conversion on to the ATR 72 after previously flying the BAe ATP. The co-pilot had also recently converted to the ATR 72.

The commander reported that, during his line training, he experienced little exposure to crosswinds greater than 10 kt but, since then, had experienced significant crosswinds with no control issues during landing. He also stated that he would routinely use the tiller on the BAe ATP during the landing roll at 80 kt and below to maintain aircraft direction, in part owing to his experience of asymmetrical braking action on the aircraft.

## Manufacturer information

In 2014, the manufacturer published a safety note<sup>1</sup>, which outlined the crosswind landing technique. In 2016, it issued a Flight Operations Information Notice<sup>2</sup> for the ATR 42 and 72. Both these publications provided guidance and recommendations on '*aircraft handling during the landing roll and deceleration*', noting that '*insufficient aileron input, crosswind will lift the upwind wing and make the aircraft turn*'. In 2018, the manufacturer presented their analysis of 18 events over a 5-year period between 2013 and 2017 which shared a number of common characteristics.

The ATR Flight Safety website<sup>3</sup> summarises the guidance and recommendations for aircraft handling during the landing roll and deceleration as follows:

- *'Review and brief crosswind landing technique for the decrab, flare and landing roll, prior to the approach (TEM);*
- *After touchdown, hold the control column nose down to increase directional efficiency;*
- *Maintain aileron input into the wind. Gradually increase it as airspeed decreases;*

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## Footnote

<sup>1</sup> ATR, 2014, Safety Note #1 '*Be Prepared for Crosswind landing*'.

<sup>2</sup> ATR, FOIM 2016/06 Issue 1 '*Crosswind landing*', dated June 7, 2016.

<sup>3</sup> <https://safety.atr-aircraft.com/my-product/prevent-runway-excursion-in-crosswind/#1574785943767-6e2e8ed0-5ba6> [accessed January 2023].

- *Correct heading deviation smoothly, using the rudder above 70 kt and progressively the tiller below 70 kt;*
- *Rudder correction upwind shall be very smooth and progressive. Most of the time, gently reducing/adjusting the rudder input downwind is enough to correct heading deviation downwind;*
- *Use brake to minimize landing roll.'*

It provides further guidance on the use of rudder stating:

*'...correction in upwind direction requires less effort than in [the] downwind direction. An equal effort will have a stronger effect upwind. Just releasing the downwind input without applying a force in upwind direction will lead to a rudder deflection in upwind side – allowing heading corrections only through downwind pedal movements.'*

### **Operator information**

#### *Operator's investigation*

Flight data showed that the aircraft swerved abruptly to the right through 10° as it decelerated through 80 kt. There was *'little to no aileron input into wind...during the ground roll'* and no application of rudder during the turn right. However, *'as the aircraft reaches the 100° track, there is a sharp input of both rudder and brake which sharply changes the aircraft direction back to the runway centreline'*.

The operator concluded that a *'lack of in-to-wind aileron was the most likely cause of the divergent path of the aircraft'* and that the crosswind *'induced a weather-vane effect that induced roll and also initiated the uncommanded turn on the landing roll-out'*. It also concluded that recovery occurred as a result of the co-pilot's application of left pedal and brake, and not through the use of nosewheel steering. It further considered that the lack of application of in-to-wind aileron may have been because the PF did not perceive the need for its application in the light crosswind, where he would have in stronger crosswinds.

#### *Operator training and guidance*

The operator identified aircraft handling during the landing roll with a crosswind as a key threat. Since it used a third-party training organisation for the type rating training of its pilots on the ATR 72, it arranged that its own instructors would deliver the final simulator session of the type rating course and additional simulator training would be conducted by its own instructors on completion of the type rating course. In addition, it arranged that its own instructors would deliver the final simulator session of the type rating course, as well as the proficiency checks and skills tests in the simulator. This enabled the operator to deliver its own instruction on the areas of aircraft handling, which included crosswind landings.

The operator's documentation advised that the *'Weathercock effect makes the aircraft turn into the wind direction'*. It recommended to use of rudder to maintain directional control, holding *'the control column in nose down position to increase directional efficiency.'* It

also cautioned '*In case of insufficient aileron input, crosswind gusts could lift the upwind wing, reduce the aircraft ground contact and could make the aircraft turn into the wind (weathercock effect).*' The guidance advised the use of nosewheel steering below 70 kt for directional control.

The part B of the operator's Operations Manual stated:

*'During the landing rollout, maintain wings level using aileron into wind, and rudder steering; at a suitable speed below 70 kts Captain resumes control (if he had been PM) of tiller and PLs [prop levers], or passes yoke control to co-pilot.'*

## Analysis

There was probably insufficient in-to-wind aileron applied during the landing roll both before and after the handover of control, which resulted in the upwind wing lifting and the aircraft turning into wind. The initial attempt to correct the turn by nosewheel steering through the use of the tiller, rather than by use of rudder to maintain directional control also likely contributed to the runway excursion.

The PF applied insufficient in-to-wind aileron and may not have recognised the need in the light crosswind, having 63 hours on type and limited experience flying it in similar conditions. The use of the tiller was probably a reversion to the technique that the commander had used on the previous type that he had flown. The manufacturer's guidance indicates that the use of rudder above 70 kt, instead of the tiller, would have resulted in better directional control.

## Conclusion

After landing in a light crosswind, as the aircraft decelerated through 80 kt, it swerved right and hit a runway edge light. The loss of directional control probably occurred because of insufficient in-to-wind aileron. The recovery of directional control was delayed by the use of nosewheel steering through the tiller, rather than the use of rudder.

## Safety actions

The operator took the following actions:

- The crew underwent further training in the simulator on the aircraft handling technique in crosswinds during landing.
- The syllabus for the operator conversion course is being rewritten to maximise crew exposure to crosswinds.
- The operator advised all involved in training on the ATR 72 to be alert to and monitor for incorrect crosswind techniques or inappropriate use of nosewheel steering through the tiller.