

Runway overrun during taxiing after landing

Aircraft	Airbus A320 registered TS-IMC
Date and time	12 March 2013 at 10 h 15 UTC ⁽¹⁾
Operator	Tunisair
Place	Paris Orly Airport (94)
Type of flight	Public transport
Persons on board	Captain (PNF), co-pilot (PF), 4 cabin crew members, 140 passengers
Consequences and damage	Nose gear slightly damaged

⁽¹⁾Except where otherwise stated, the times shown in this report are expressed in Universal Time Coordinated (UTC).

This is a courtesy translation by the BEA of the Final Report on the Safety Investigation. As accurate as the translation may be, the original text in French is the work of reference.

1 - HISTORY OF THE FLIGHT

Note: The following elements are based on data recorded in the flight data recorder (FDR), the cockpit voice recorder (CVR) and accounts from the flight crew.

At 7 h 12, the aircraft took off from Djerba airport (Tunisia) bound for Paris Orly (94). The co-pilot was flying (PF). During the flight, the crew were informed of the 9 h 47 ATIS R message indicating that runway 08 was the only active runway and was covered with dry snow, and that it should be vacated either via runway 02/20 or taxiway W31 (end of runway 08) (see Appendix).

Previously, at 9 h 32, the crew had acknowledged receipt of a message from the controller informing them that braking conditions on runway 08 were "medium".

At 09 h 51 min 33, the controller informed the crew that braking conditions had changed from "medium" to "medium to poor". At each callout, the crew recalculated the corresponding landing distances. They also understood that there was slush on the runway.

At 10 h 06, the Tower controller cleared the crew to continue the approach, indicated that the wind was from 040° at 8 kt and added that the previous pilot had qualified braking conditions as "medium". During the approach, the crew discussed the risk of a runway excursion.

At 10 h 09, the controller informed the crew that braking conditions were "medium to poor".

At 10 h 10, the aeroplane was in landing configuration. The calibrated airspeed was 161 kt for a landing reference speed (Vref) of 137 kt. The A/THR was engaged and the autopilot was in LOC/FPA mode⁽²⁾. The autobrake was set to "medium".

The final approach was stabilized passing through 1,000 ft and the crew continued to descend. At 10 h 12 min 20, the controller issued the landing clearance.

⁽²⁾LOC/FPA: Autopilot function to follow a Localizer axis and a Flight Path Angle that have been selected and displayed.

The aeroplane landed at 10 h 13 min 30 (calibrated airspeed 136 kt). Thrust reversers were deployed at 10 h 13 min 31. Deceleration was stable (around 0.3 g). On the ground during the landing roll, the captain took control in accordance with the operator's procedures with the intention of vacating via runway 02/20.

At 10 h 13 min 46, the autobrake was disengaged by pressing the brake pedals. The deceleration was then 0.12 g and the ground speed 69 kt. The thrust reversers were retracted at 10 h 13 min 56.

At 10 h 13 min 58, with the aeroplane travelling at 42 kt and approaching the intersection with runway 02/20, the controller asked the crew to vacate via the end of runway 08.

The crew continued rolling towards the end of the runway located approx. 1,700 meters away. A slight increase in N1 due to an input on the thrust levers was recorded between 10 h 14 min 03 and 10 h 14 min 40, and the ground speed stabilized around 60 kt.

At 10 h 14 min 45, the crew began to apply the brakes about 480 meters from the runway end. The deceleration was 0.12 g and greater braking action did not slow the aeroplane (ground speed 35 kt, deceleration 0.12 g until 10 h 15 min 11).

The Captain used the parking brake and tried to control the path using the rudder pedals.

At 10 h 15 min 12, the aeroplane overran the runway at a ground speed of 17 kt (see photo below). It came to a stop four seconds later. The Captain notified ATC and indicated that braking was poor. Emergency teams took swift action.

No fire hazard was detected.

At 10 h 21 the Captain informed the controller that braking was *"very, very poor"*.

Forty-five minutes later, the passengers disembarked via a walkway positioned at the left-hand aft door.



2 - ADDITIONAL INFORMATION

2.1 Meteorological Situation

On 12 March 2013 at Orly airport, snowfall was continuous and variable between 7 h 00 and 23 h 45. There was an N to NNE surface wind of about 10 knots. Measured snow depth reached 8 cm during the day.

Between 10 h 00 and 10 h 20, precipitation occurred in the form of continuous light snow, with a surface wind from 020 degrees at about 6 kt.

The investigation could not determine if the crew was aware of the SNOWTAM report of 9 h 31. However, the crew knew that there was slush on the runway.

2.2 Treatment of Airport Ground Areas

Aéroports de Paris (ADP) is the manager of Orly airport.

Precipitation started around 4 h 30 in the form of freezing rain followed by continuous snow for the whole day.

The actions carried out on runway 08/26 were as follows :

- surface treatment and return to operation at 6 h 45 ;
- from 7 h 30 onwards, treatment of runway 06/24 involved switching to single runway operation, using runway 08/26 for both takeoffs and landings ;
- between 9 h 14 and 9 h 23, adherence measurements were communicated to the various participants, including the control tower, and were integrated in the SNOWTAM report of 9 h 31 and the METAR issued at 10 h 00. The reported values corresponded to "medium" braking action.

2.3 Braking Action and Emergency Braking Procedures

Following this event, Airbus estimated braking efficiency (braking system performance) using the parameters recorded during the landing roll on the last third of the runway. The result ranked the braking as "Medium to Poor".

In the event of a loss of braking, the QRH "Loss of Braking" procedure must be performed from memory. It consists, regardless of the speed, in fully activating the thrust reversers and applying maximum braking pressure to 1000 PSI. If the aeroplane still does not brake, the procedure requires using the parking brake several times in succession.

2.4 Crew Testimony

The Captain and copilot reported having regularly taken into account the weather information during the approach. Landing took place normally on a slightly contaminated portion of the runway. As they were about to exit the runway via W4, the controller asked them to roll on to W31. They then found that the last third of the runway was not clean and that snow was present on the surface, unlike the touchdown zone. The Captain said he was surprised and helpless when braking. The copilot said that the last third of the runway seemed to be icy. The aeroplane overran the runway while the Captain was using the parking brake as a last resort.

3 - LESSONS LEARNED AND CONCLUSION

3.1 Findings

- ❑ The crews that landed before the Tunisair flight had estimated the braking efficiency to range between “medium” and “medium to poor”. These indications were observations provided for information purposes only and did not concern the condition of the end of the runway.
- ❑ The crew correctly managed the landing roll in order to exit the runway at mid-point. They were not concerned by the controller’s request to roll to the end of the runway (W31) as they referred to the braking efficiency observed up to then.
- ❑ Frequent takeoffs and landings on the same runway tend to limit the accumulation of contaminant on the rolling portion used by aeroplanes. However, the ends of runway, being less used, become contaminated more quickly and can be very slippery. The ATC service should be reminded of this to assist them in managing runway exits.
- ❑ The use of measuring equipment is highly disadvantageous from an operational perspective as it requires closing the runway for about twenty minutes. However, no remote real-time measuring equipment is available to date. Nevertheless, the fact that the last third of the runway was not properly cleared of snow represented a potential risk of overrun, especially in case of an aborted takeoff.
- ❑ The aeroplane only partially overran the runway and the incident might have been avoided by applying the “Loss of Braking” procedure.

3.2 Causes

The inability to measure runway adherence in real time did not allow the uneven runway contamination to be detected. This led to the crew’s and controllers’ degraded perception of braking conditions at the end of the runway, resulting in the overrun.

The failure to apply the “Loss of Braking” procedure may have contributed to the incident.

APPENDIX

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MOUVEMENTS A LA SURFACE Ground movements

PARIS ORLY

