

## ***FINAL REPORT***

### **3. CONCLUSIONS**

#### **(a) Findings**

##### **The runway excursion**

1. The crew were properly qualified, licensed and rested in accordance with USA FAA Regulations, to undertake this flight.
2. The aircraft had a valid Certificate of Airworthiness and had been maintained in accordance with an appropriate and approved schedule.
3. No evidence was found of any technical problem on the aircraft, or its systems prior to the aircraft departing the paved runway surface.
4. The auto-braking system was originally set at medium (MED). However, after a brief discussion between the PF and the RFO, auto-brake minimum (MIN) was set for the landing. The Operators Pilots Reference Manual (PRM) recommends the setting of auto-brake to (MED) for wet runway conditions.
5. The approach reference speed of Vapp 153 KT was confirmed to be within one knot of the Vref for the calculated landing weight.
6. Under the prevailing weather conditions the approach was considered stable from 7 nm down to the touchdown point.
7. The ATC reported landing wind of 210°/ 20 KT was correctly recorded and displayed at the time of N803DE's landing.
8. The runway condition was correctly reported as "Wet" for the landing. A post runway excursion inspection of the runway surface and an analysis of the runway friction tests indicate that no significant standing water was present and the braking action was good.
9. The aircraft touched down firmly within the landing touchdown zone, on the centreline and at an airspeed of approximately 145 KT.
10. The aircraft heading on touchdown was 277°. The runway heading is 281°.
11. Nose wheel contact was made approximately 2-3 seconds after main wheel touchdown. The spoilers and reverse thrust deployed and functioned as per their specification.
12. Approximately 3 seconds after nose wheel contact the elevator deflection decrease from 20° aircraft nose down to at or near its neutral position.
13. About 8 seconds after touchdown, all four ailerons flared to approximately their neutral position and remained there for the remainder of the rollout.

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14. At about 10 seconds after touchdown and with spoilers and reverse thrust fully deployed, the aircraft was subjected to a sudden and violent gust of wind from the left, which was approximately 23 KT above the reported landing wind of 210°/20 KT. This particular gust was unforeseeable and unexpected.
15. The aircraft initially drifted downwind to the right and then yawed to the left.
16. The pilot could not contain the yaw rate to the left, indicating that the nose wheels were beyond the limit of their adhesion. The lack of a sustained forward pressure on the control column during the rollout would have the effect of unloading the nose wheel tyres, thereby contributing to a reduction in the tyre friction forces.
17. The combination of CVR analysis, the identified nose-wheel cuts/scratches and the runway tyre prints, indicate that the tiller and nose-wheel were deflected to their fully right position shortly after the un-commanded yaw to the right and this condition remained until the aircraft came to a halt. The Operators PRM recommends not to use nose wheel steering tiller until airspeed is reduced to taxi speed (approximately 25 knots).
18. An examination of the nose-wheel and main wheels revealed no evidence of skidding or hydroplaning.
19. The aircraft departed the left side of the runway at a ground speed of approximately 35 KT
20. The meteorological facilities, including recording/display at Dublin Airport are in full compliance with the ICAO Annex 3 provisions.

### **The Emergency Response**

21. The Airport Fire Service was in attendance at the stricken aircraft within 2 minutes of the crash alarm being sounded. Both the Airport Fire Service and the Civil Emergency Services responded in a professional, timely and efficient manner.
22. A period of 4 minutes elapsed from the time that the aircraft came to a halt until the Captain made his first PA to the passengers.
23. The Captain's decision not to carry out an emergency evacuation using the emergency slides was, in the opinion of the Investigation, correct.
24. At the time of the runway excursion, no formalised procedure was in place at Dublin Airport for the operation and use of an emergency discrete frequency.

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25. Dublin Airport was closed for a total of 47 minutes as a result of the runway excursion. RWY 28, the main runway, was closed for approximately 35 hours.
26. The air-side initial emergency response to the incident site was conducted in a timely and professional manner. However, due to difficulties experienced in gaining access to the aircraft, the disembarkation of passengers did not occur until approximately 2 hours after the aircraft came to a halt.
27. The International Civil Aviation Authority does not provide provisions in Annex 14 for disembarkation from an aircraft that has been involved in a runway excursion and where, for any reason, the emergency evacuation slides are not used.
28. An examination of the Airport Authority Emergency Response Directive No. 3 (2001) by the Investigation determined that it lacked detail and required updating.
29. While recognising the Operator's commitment and duty of care to the passengers, the Operator's Staff at Dublin Airport failed to correctly activate and manage their emergency response plan.
30. The nominated Emergency Operations Centre in place at Dublin Airport at the time of this event was inadequate for its purpose.
31. The newly allocated Airport Authority Coordination Centre (AECC) is not available on immediate standby and is not appropriately equipped to cope with a major airline accident at Dublin Airport.
32. A review of the Airport Authority Emergency Support Response accommodation facilities indicate that, in the event of a major accident at Dublin Airport, some of the nominated facilities may not be immediately available, suitably located/equipped or fully adequate to cope with large numbers of people.
33. There is no medical centre available at Dublin Airport.

### **(b) Cause**

The cause of the runway excursion was that the aircraft was subjected to an unexpected and sudden wind gust during the initial stages of the landing rollout, inducing a rate of yaw to the left, which could not be controlled by the pilot flying.

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### **4. SAFETY RECOMMENDATIONS**

The following safety recommendations were made during the course of the Investigation.

#### **4.1** SR 7 of 2002 was originally issued as an Interim Safety Recommendation on the 18 February 2002. It reads:

“The Irish Aviation Authority should ensure that airports in the State, formalize a procedure, whereby airport fire services are allocated a discrete emergency working frequency in order that they can maintain continuous communications with the crew of a disabled aircraft”. **(SR 7 of 2002)**

The IAA’s response to this Interim Safety Recommendation, was as follows:

*The Authority agrees objectively with this recommendation but is still examining the issue of enforcing it as such. Prior to the subject event, the Authority, acting on behalf of the ODTR (which is in fact the agency with the authority to allocate such frequencies at the present time) had requested and provided the frequency of 121.6 MHz to the crash rescue services at Dublin Airport as a dedicated ground frequency for crash rescue purposes. It is, therefore certainly possible to enable such a frequency, at least at the State Airports. Since the above incident, in the light of the recommendation, the same frequency has been allocated to Cork and Shannon Airports. The Authority will include a reference to this frequency in the aerodrome licensing procedures and will endeavour to establish a procedure for its use when required. It is not proposed at this time to further extend the allocation of this frequency to other airports, in view of their limited traffic.*

#### **4.2** SR 8 of 2002 was originally issued as an Interim Safety Recommendation on the 18 February 2002. It reads:

“The Irish Aviation Authority should ensure that airports in the State, review the adequacy of their procedures and equipment for the disembarkation of passengers and crew from an aircraft, which departs the paved surface and is unable, for any reason, to use the emergency evacuation slides or airstairs”. **(SR 8 of 2002)**

The IAA’s response to this Interim Safety Recommendation, was as follows:

*The Authority has also researched the second recommendation which it objectively agrees, but finds that it falls within the scope of facilitation at airports rather than under a safety remit. As such the Authority is in a position only to recommend compliance by aerodrome operators, which it will do. It should be pointed out that crash rescue vehicles at aerodromes are required to carry access ladders to cater for a situation where an evacuation slide fails to deploy in the event of an emergency evacuation. The Authority will verify that such equipment is indeed available at airports under its licensing remit.*

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In light of the IAA response, the Investigation considers that this safety recommendation is more appropriate for action by the Airport Authority. The Investigation does recognise that the responsibility for disembarkation of passengers from an aircraft presently lies with the airline/handling agent.

The Airport Authority has, in its Disabled Aircraft Recovery Planning Manual, already taken suitable remedial action, therefore, no further action is required.

- 4.3** The International Civil Aviation Organisation should consider providing provisions in Annex 14 and related guidance material for gaining access to a disabled aircraft where, for any reason, the emergency slides are not deployed. **(SR 5 of 2003)**
- 4.4** The Airport Authority should consider amending Directive No. 3 in order that the Duty Airport Manager (DAM), following consultation with the AFO/On-Scene-Commander will categorize the level of emergency support response required following an occurrence. **(SR 6 of 2003)**
- 4.5** The Airport Authority should carry out a review of all the accommodation facilities required for emergency support response at Dublin Airport. **(SR 7 of 2003)**
- 4.6** The Operator should reiterate to their Flight Crews the need to comply with the Flight Operations Manual (FOM), in particular with regard to evacuation procedures and the PA announcements to be made immediately following an emergency situation. **(SR 8 of 2003)**
- 4.7** The Operator should conduct an audit on its Irish Stations in order to confirm the compatibility of their emergency plan with that of the Airport Authority and the appointed Handling Agent. **(SR 9 of 2003)**
- 4.8** The Operator should ensure that, foreign-based station staff, are fully aware of their responsibilities and functionality of their Local Emergency Response action plans. **(SR 10 of 2003)**
- 4.9** The International Civil Aviation Organisation should consider amending the provisions of Annex 14, Chapter 9, Emergency and Other Services, Para 9.2.31, Communication and Alerting System, to include the term “*disabled aircraft*”, when linking the discrete frequency with the fire station, the control tower, any other fire stations on the aerodrome and the rescue and fire fighting vehicles. **(SR 11 of 2003)**
- 4.10** The International Civil Aviation Organisation should consider amending the provisions of Annex 14, Chapter 9, Emergency and Other Services, to include, in broad terms, the need for the Airport Operator/Authority to provide and nominate fixed facilities for the care of passengers and meeters/greeters during an aircraft accident or emergency situation. **(SR 12 of 2003)**