

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

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ADDENDUM 5

TO THE

OPERATIONS / HUMAN PERFORMANCE

GROUP CHAIRMEN'S FACTUAL REPORT

DCA09MA021

**BOEING RESPONSES TO QUESTIONS
ABOUT CROSSWIND GUIDELINES**

Boeing provides the following in response to the NTSB's questions concerning Boeing's crosswind guidelines.

a) The operational meaning of a Boeing crosswind "guideline"

Boeing Response:

Under federal aviation regulations, aircraft manufacturers are not required to establish crosswind guidelines. However, Boeing has provided additional manufacturer guidance for both dry and contaminated runways, in an effort to help airlines establish their own operational policies for crosswind conditions. Boeing's crosswind guidelines are not considered limitations, and it is recognized that airlines may deviate from the Boeing guidelines based on standardization and/or operating environment. Boeing crosswind guidelines do not address gusts.

b) The methods Boeing used to develop the 737-500 dry runway crosswind guideline:

Boeing Response:

The Airplane Flight Manual maximum demonstrated crosswind value of 35 knots was used as a starting point. Based on previous studies, the engine out RTO at (V1-5) was considered to be the most critical maneuver (light weight and aft cg). The engineering simulator was used to evaluate this condition with a 40 knot crosswind.

The engineering simulator analysis used a mathematical pilot on the pedal to maintain centerline as the airplane was accelerating. At V1-5 knots, the critical engine was failed and, after an appropriate pilot delay, pedal was used to return the airplane to the centerline. If the airplane returned to the centerline without exceeding the runway width (150 Feet), the condition was considered acceptable.

c) A maximum crosswind value of 40 knots was used for commonality across the fleet, as this has been shown to give satisfactory operational flexibility for operators. How wind characteristics and pilot performance were accounted for during this process (dry runway guidelines) :

Boeing Response:

A constant crosswind was used. A simulated pilot delay in the math pilot recovery model was assumed, after which full rudder was allowed if needed.

d) Whether the process involved any assumptions that might have implications for industry training standards (including simulator fidelity requirements and environment modeling):

Boeing Response:

It is assumed that a pilot will use basic airman skills, including normal crosswind techniques. There is also an expectation that a pilot will utilize the control capabilities provided to him/her.

e) Whether, as a result of the CAL 1404 accident, Boeing thinks crosswind guidelines for the 737-500 should be revisited:

Boeing Response:

As discussed during our meeting in Seattle last month, Boeing does not believe it is necessary to revisit its crosswind guidelines. Millions of hours of service suggest that the current guidelines are sufficient. The lack of rudder pedal input as Flight 1404 departed the runway makes this an inappropriate case to base changes to the crosswind guidelines, as there is no data suggesting that the crosswinds experienced during this event exceeded the capability of the airplane.