

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



CEN22LA130

AUTOMATIC DEPENDENT SURVEILLANCE- BROADCAST (ADS-B) STUDY ADDENDUM

Airplane Performance Study Addendum

By

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A. ACCIDENT

Location: Aspen, Colorado
Date: February 21, 2022
Time: 11:33 mountain daylight time (MDT)
18:33 UTC
Aircraft: RAYTHEON AIRCRAFT COMPANY HAWKER 800XP

B. PERFORMANCE STUDY ADDEDUM

1.0 Minimum Rotation Speed

According to 14 *Code of Federal Regulations* 25.107, Takeoff Speeds, the minimum rotation speed, V_R , may not be less than a speed that

... will result in a V_{LOF} [the calibrated airspeed at which the airplane first becomes airborne] of not less than 110 percent of V_{MU} [the calibrated airspeed at and above which the airplane can safely lift off the ground]...

Therefore, for a reported V_R of 121 kts, the airplane should be able to rotate at a speed of 110 kts. Any time after achieving V_1 (111 kts) the crew should have had sufficient air load to rotate the airplane. This is not consistent with the crew account that the yoke did not have any air resistance when the yoke was pulled back, considering that the wreckage exam found control continuity. Even if the tailwind increased to more than the maximum reported gusts of 25 kts after V_R or if the call to rotate was made before V_R was achieved, the airplane's airspeed should have resulted in noticeable air resistance on the yoke when pulled back. These discrepancies cannot be resolved with the evidence available.

2.0 Tailwind Effect on Overrun Speed

The airplane was limited to a maximum tailwind of 10 kts at take-off, but the difference between the V_1 call out and the ADS-B groundspeed indicated a tailwind of 17 kts and increasing. If the take-off had occurred with a tailwind of 10 kts instead of 17 kts, the airplane would have reached V_R some 3 seconds and 770 ft earlier at a groundspeed of roughly 144 kts. Assuming the airplane failed to rotate in that situation, the decision to reject the takeoff could have been taken at a lower speed with more runway remaining.

During the accident, the airplane continued to accelerate for three to four seconds after the V_R callout. Assuming the same delay, the airplane's maximum

groundspeed would have been 156 kts at 3,600 ft from the end of the runway when it began to decelerate rather than 165 kts at 3,000 ft from the end of the runway. Further, the initial deceleration rate was only about -0.1 g, and the call to abort was some 8 seconds after the airplane reached its peak speed of 165 kts. A similar deceleration profile would have put the airplane off the end of the runway at a groundspeed of 70 kts instead of 121 kts.