

**Aviation Safety Investigation Report  
198800004**

**Boeing 747-238B**

**7 July 1988**

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encountered during rotation when 8.5 or more units are required, will be approximately 40 to 50 percent of the elevator force experienced at lighter weights and mid or aft CG positions. The Second Officer had not previously experienced a takeoff under the existing weight and flap conditions, and was unaware of the comments in the Operations Manual relating to lighter elevator forces. It is possible that the tailstrike would not have occurred if rotation had been initiated at the correct speed. However, the reason that rotation was commenced 11 knots below the target speed could not be established.

**Significant Factors:**

The following factors were considered relevant to the development of the accident

1. Rotation for takeoff was commenced 11 knots below the appropriate reference speed. The reason for this was not determined.
2. The Second Officer had not previously conducted a takeoff under the existing flap and weight configuration. This information was evidently not discussed during the pre-takeoff briefing.
- 3 The Second Officer was unaware of comments contained in the Company Operations Manual relating to reduced elevator control forces under the existing conditions.
- 4 The rate of pitch change during rotation was almost double the normal rate.