- DOCKET NO. **SA 510**
- EXHIBIT NO. 13 I

NATIONAL TRANSPORTATION SAFETY BOARD WASHINGTON, D.C.

Excerpted Data From Various Studies

KINEMATIC MODEL

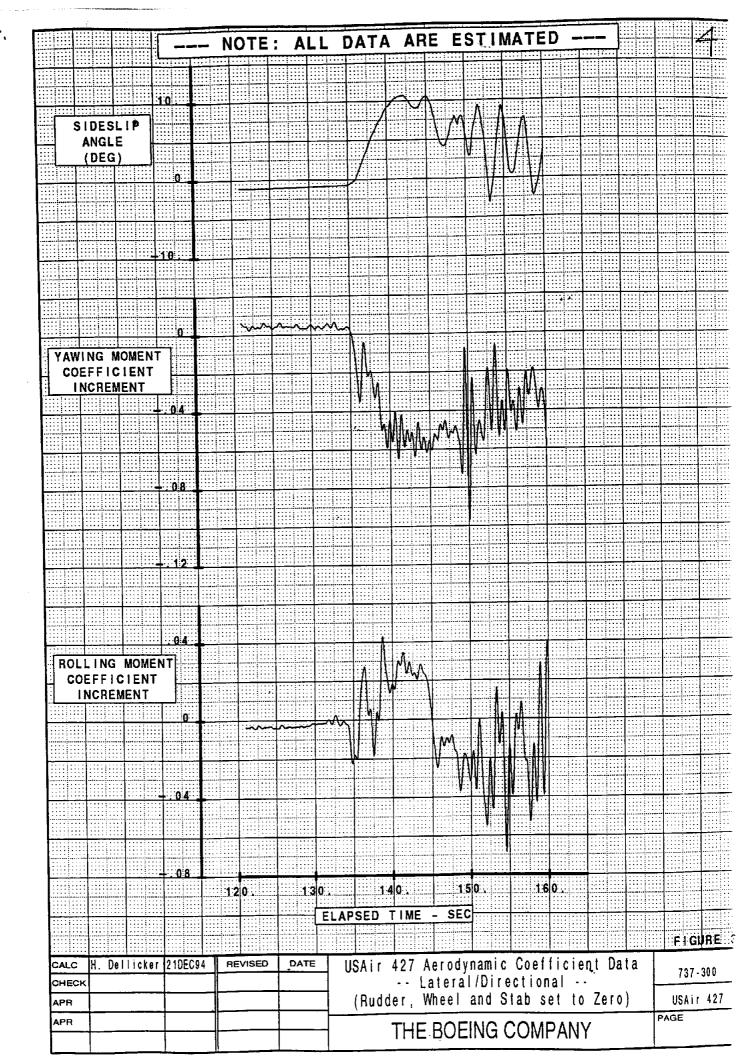
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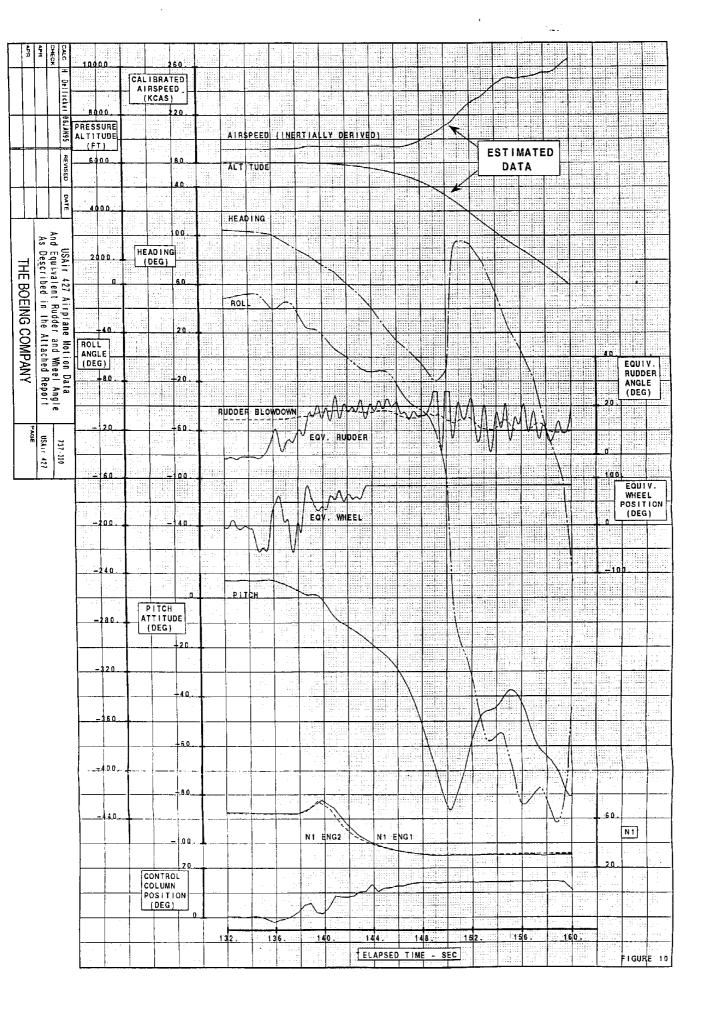
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Tom,

Attached are 2 sets of plots for the B-727 at the conditions as I know The weather data which you sent suggests that there would them. be little turbulence at the flight altitude so I ran cases for no turbulence and light turbulence to give you some bounds on the problem.

4

The "DESCENT" and "DECAY" charts labeled No turbulence represent the strongest possible vortices. The two lines on each chart correspond to different wing span loadings or more precisely the ratio of vortex spacing to wing span caused by different span loadings. Vortex spacing/wing span (or b/s) for elliptic loading is pi/4 theoretically or about 0.78 and I believe the value of 0.7 was used by Boeing in their calculations. At any rate, this range should bound the spacing/span. For no turbulence, b/s of 0.7 descends more than 300 ft in 70 sec and b/s elliptic goes about 250 ft. The MAXIMUM strength at 70 seconds is about 2000 ft2/sec for b/s of 0.7 and this is probably higher than the actual value since at this strength and spacing they would descend more than 300 ft.

The charts labeled "Light Turbulence" are my best guess at actual The vortices descend about 250-300 ft depending on b/s conditions. and are at about 1300-1400 ft2/sec at 70 seconds. Since the vortices must move down about 300 ft, this bounds the strength between about 1300 and 2000 ft2/sec. This is about the range that was tested in the Boeing simulator. Our calculations in the past have indicated that this strength is sufficient to cause some rolling motion but not sufficient to flip a B-737 upside down.

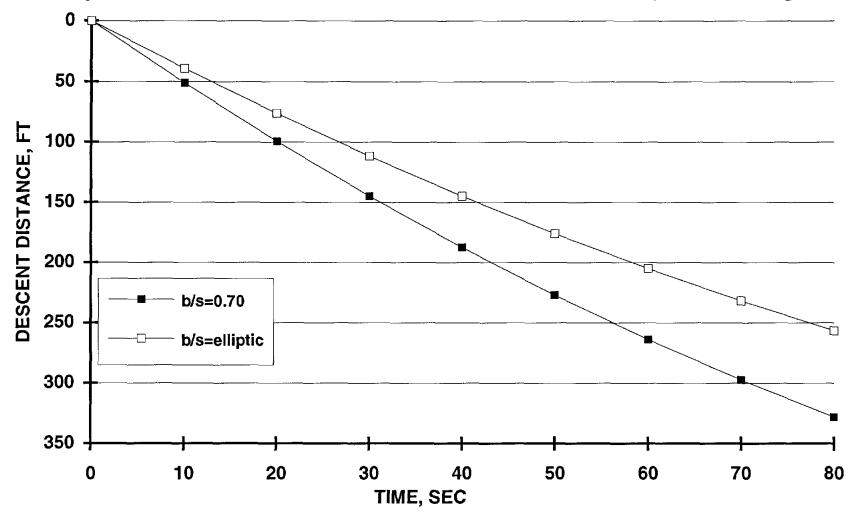
The sky is very big and a vortex is small so it is impossible to say for sure that there was a vortex encounter. However, there was a vortex in about the right location to be hit and the simulated encounters seem to be consistent with the predicted vortex strength.

Please let me know as soon as you are sure that my testimony is required and the topics which I should be prepared to cover.

George Greene

B-727 WAKE DESCENT

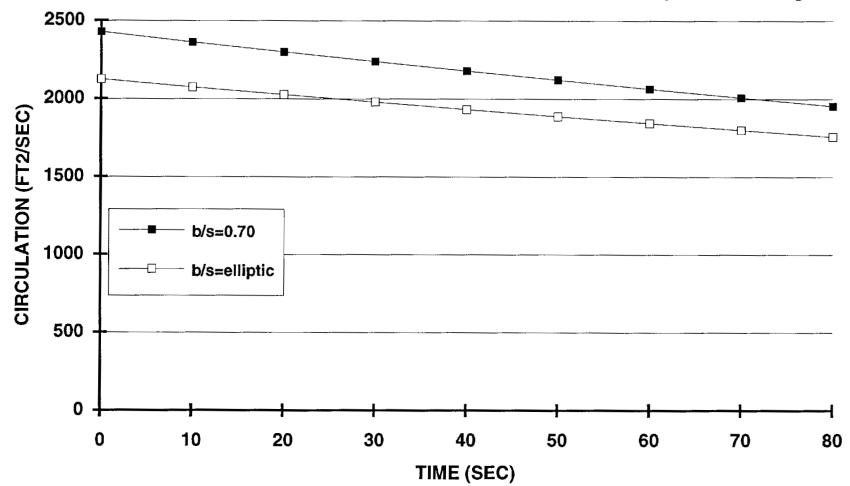
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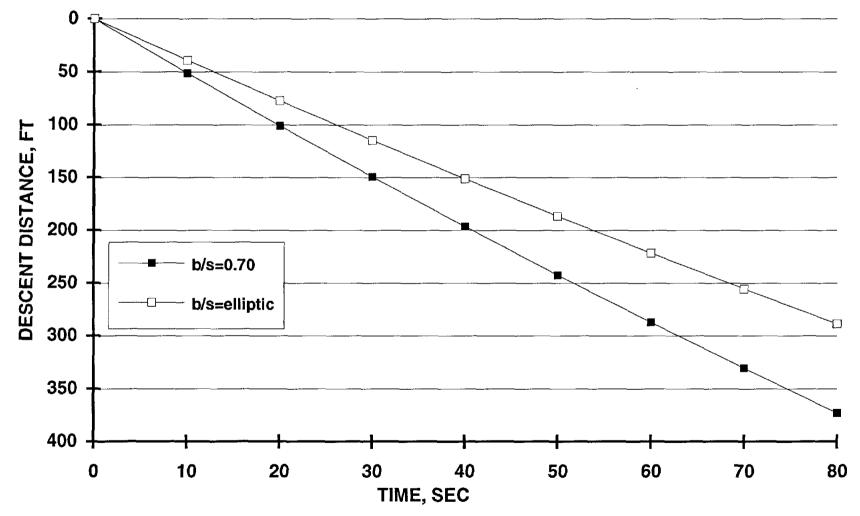
B-727 WAKE DECAY

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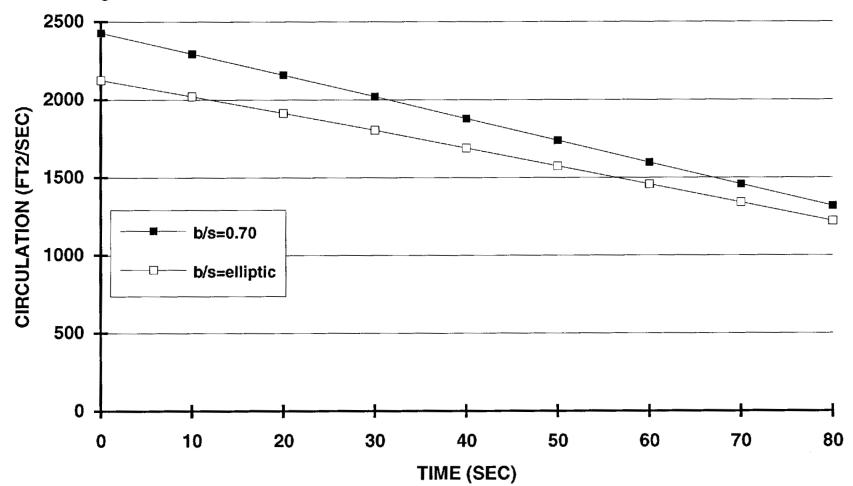
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No Turbulence or Stratification, 205 kts TAS, 126.4k lbs, Density=0.001988 slugs/ft3



B-727 WAKE DECAY

Light Turbulence and Stratification, 205 kts TAS, 126.4k lbs, Density=0.001988 slugs/ft3



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