NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, D.C. 20594

April 24, 2014

Video and Image Study
11 imbedded images

John Clark

A. ACCIDENT: ERA14FA182

Location:	Summerfield, FL
Date:	April 6, 2014
Time:	Local
Airplane:	RV-7

B. GROUP IDENTIFICATION

No group was formed for this activity.

C. DISCUSSON

The airplane was being used as a platform to record video. A video recording of the airplane in the last few seconds of flight show the airplane in a steep descent and steep bank angle (near 90 degrees left wing down). The wings levelled and the steep descent continued to the ground.

On scene, the elevators were jammed in a down position. This study shows that the angle of attack was increasing in the last few seconds. The angle of attack follows the elevator position which indicates that the elevator trailing edge was up and was increasing in the upward direction.

D. DETAILS OF STUDY

Series of Video Images

Seven images extracted from one video are presented below. The series of images provide a good overview of the last few seconds of the flight.

Image 1 – The airplane is low, about 20 degrees nose down and 90 degrees left wing down.

Image 2

Image 3

Image 4

Image 5

Image 6

Image 7

Method of Reconstruction Using Extracted Photos

Image 8 - Image 4 was used as the baseline photo. The relative position of the airplane in each of the other photos was transposed to Image 8.

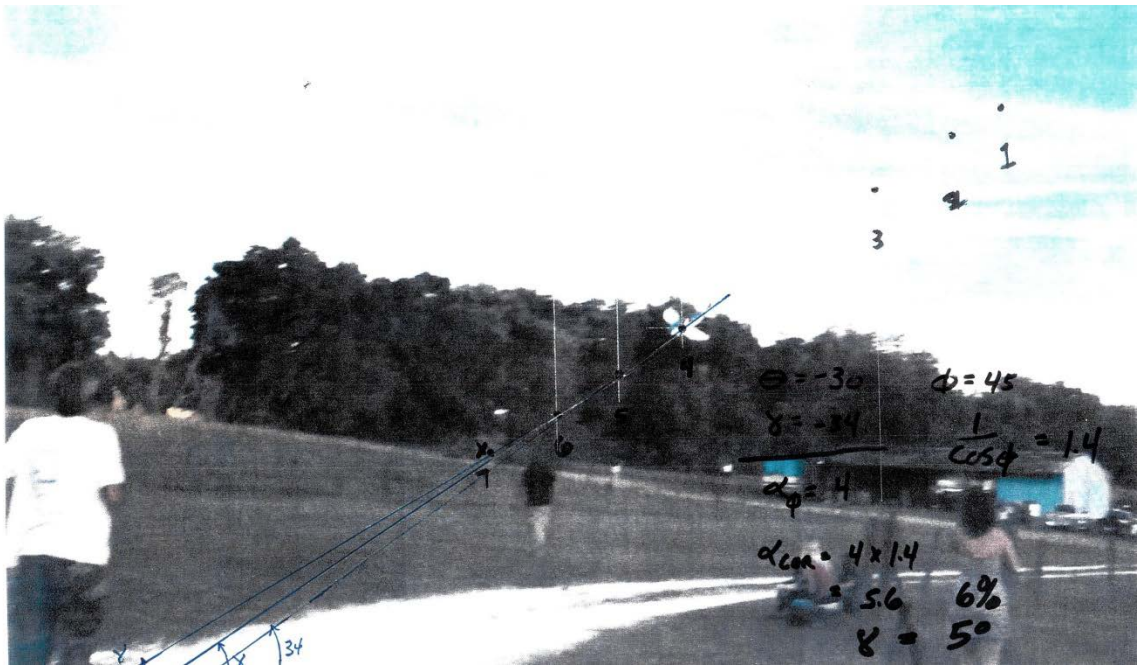

Image 9 - The measured flight path is -34 degrees. The measured pitch attitude is -30 degrees. The difference is a perceived angle of attack of 4 degrees. The airplane is banked about 45 degrees. The airplane is about 20 degrees from perpendicular to the viewing angle. The correction due to the bank angle is +40% and the correction due to the viewing angle is -6%. The corrected angle of attack is 5 degrees.

Image 4 - The measured flight path is -33 degrees. The measured pitch attitude is -23.5 degrees. The difference is a perceived angle of attack of 9.5 degrees. The airplane is about 20 degrees from perpendicular to the viewing angle. The corrected angle of attack is 9 degrees.

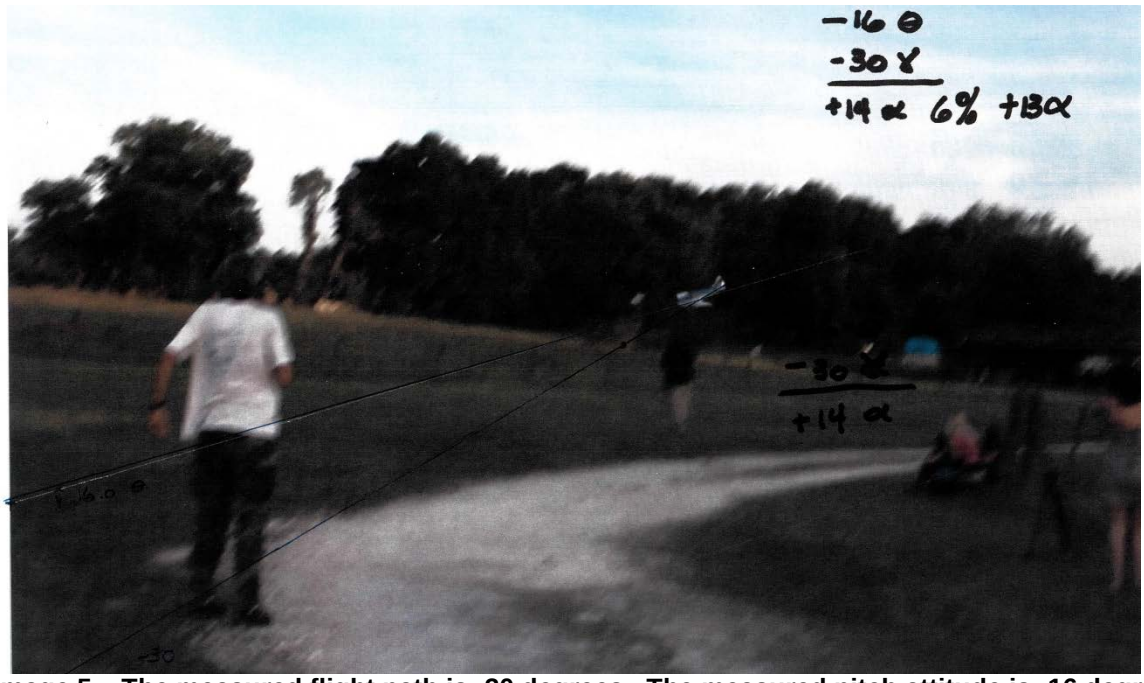

Image 5 – The measured flight path is -30 degrees. The measured pitch attitude is -16 degrees. The difference is a perceived angle of attack of 14 degrees. The airplane is about 20 degrees from perpendicular to the viewing angle. The corrected angle of attack is 13 degrees.

Accuracy of the information.

Several corrections are made to the perceived angles. 1) The bank angle lessens the perceived angle of attack, which is the difference between the pitch attitude and the flight path angle. The perceived angle of attack can be increased by the value of 1/cos(bank angle) to derive a corrected angle. 2) The airplane is not oriented 90 degrees to the camera. The airplane orientation is about 20 degrees from perpendicular. The perceived angle of attack is greater than the actual angle. The perceived angle of attack can be decreased by the cos(orientation angle) or cos(20).

E. SUMMARY

The airplane is first viewed in a near 20-degree nose down and 90-degree left wing down attitude. The flight path steepens until the bank angle is lessened. The last four images show that the angle of attack is increasing and the flight path is decreasing to a lesser angle. The changes in angle of attack would closely follow changes in elevator angle.

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