SUBSEQUENT INVESTIGATION AND ANALYSIS

The Austria wreckage was left where it impacted until the local FAA inspector could arrive for the examination. This preliminary examination took place within three hours after the accident. Both the owner and the FAA inspector checked the airframe and the control system, and they could not find any evidence of any type of flight failure or misassembly.

The following day the same FAA inspector came by my hospital room to get my account of what happened. I told him that although I had heard no unusual noise it appeared to me that the control stick lost system continuity such that I could not apply nose down elevator control even though I had the stick all the way forward.

A thorough inspection was made the next day with the elevator control system receiving a most careful scrutiny. Again no evidence could be found of any airframe or control system failure. This news was unexpected by me because I had been so sure that was the answer.

I understand that during the summer of 1964 an Austria SH model spun into the ground under mysterious circumstances and its highly experienced pilot was killed. ("Facts vs. Rumors," *Soaring* for January, 1966, page two.) I understand that "pilot error" was listed as the probable cause. With my previous Austria experience I knew this could easily be the cause since the Austria tip stalled easily and spun quite dramatically if stall recovery action is not taken immediately. Until my last Austria flight, I *confidently believed* that I could control this sailplane anytime and anywhere.

There is very little chance for a pilot to survive a spin-in crash in an Austria because this machine descends at a high rate in a spin, the fiberglass nose offers little pilot protection in such a crash, and the relatively heavy wing is close to the pilot's back. I thank my lucky stars that I had adequate altitude to make good a parachute escape when I encountered this abnormal spin condition. Had I been too low there is little doubt in my mind that I would have made the statistics under "mysterious circumstances," and that "pilot error" would have been listed as the probable cause.

If indeed there was no control system or structural failure in the Austria, and one assumes that I did correctly attempt to recover from the spin, then we must look further for the answer.

I have had quite a bit of time recently to lie in my bed and think about this, as I contemplate the cast around my right leg. I think I have found, at least theoretically, a cause that can match the phenomena observed during this disastrous flight, and still not require that any control system or structural failures to have occurred.

This theory is that it is possible to get either one or both of the Austria's all-moving V-tail surfaces into a deeply stalled condition when the sailplane is at a high angle of attack and full forward stick is applied. A surface so stalled would provide little lift to force the sailplane's nose down, and would create a large drag force which, because the tail surface aerodynamic center is above the glider's center of gravity, could tend to actually force the glider's nose up. This theory could be checked by wind-tunnel testing or by flight testing in another Austria.

If this theory proves to be correct it would be my opinion that a recovery may still be possible through attempting to unstall the tail surfaces by bringing the control stick *back* to neutral or maybe a nose up position, then easing the stick forward to unstall the sailplane's wings. If this was not enough, then perhaps jettisoning the canopy may reduce the unstable nose up moment produced by the fuselage nose sufficiently to permit recovery. Such recovery techniques are, of course, non-standard and would be unacceptable for a Standard Category aircraft. I think the only practical solution to such a tail stall problem would be to move the allowable aft-C.G. limit forward sufficiently so that the sailplane's nose would go down if and when the tail stall is encountered.

It may be possible to prevent tail stall by reducing the trailing-edge-down travel of the tail surfaces, or incorporating anti-stall devices on the tail surfaces such as vortex generators, slots, or slats. However, the C.G.-limit change would probably be both more effective and practical.

Allowable center-of-gravity range for the Standard Austria is shown in revision one of its operations manual as between 14.2 and 18.1 inches aft of the leading edge of the root rib. There is insufficient data shown in the operations manual to compute exactly where this is in respect to its mean aerodynamic chord. Another source of data (OSTIV, *The World's Sailplanes*, Vol. II, p. 36 (Erratum Slip) shows the allowable C.G. range for the Austria to be between .26 MAC and .36 MAC aft of the leading edge of the Austria's mean aerodynamic chord, a generally acceptable range.

The Austria which became uncontrollable with me had its C.G. at about 16.2 inches aft of the root chord's leading edge, which is almost exactly in the middle of the recommended range. This center-of-gravity value was derived through standard calculations, using the factory measured empty weight and C.G. values delivered with the sailplane documents, and adding the moments due to the pilot, parachute, instruments, and radio installation.

The official Federal Aviation Agency investigation of this accident is in progress as of this writing, but it may be some time before this investigation is complete and the Civil Aeronautics Board publishes its findings.

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Historical Notes

Several attempts have been made to do away with the necessity for a large crew. In Germany a motorcycle was used to wind up the shock cord and launch the glider. In other cases, the ends of the rubber cable were fastened to heavy stakes driven into the ground or tied to trees and the machine was pulled backward by means of a winch, just as a slingshot is stretched. When the cables were pulled to their limit, the pilot gave the signal to an assistant to trip the release that allowed the machine to shoot into the air. In similar experiments, an automobile pulled back on the glider, replacing the winch.

— THE BOOK OF GLIDERS