SAFETY FIRST

The Gray Hair Department

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As noted in a recent issue of *Soaring*, Robert Greenbaum, pilot, and Craig Protsman, passenger, lost their lives at Elsinore, California, when the L-K in which they were flying suffered a structural failure of the right wing, causing the wing to separate from the fuselage. This is the second L-K wing failure in recent years.

The cause of the structural failure at Elsinore is not known and will not be known until the Civil Aeronautics Board has finished their investigation. All pertinent aspects of the failure are being investigated, including a laboratory analysis of specimens of the failed spar by the Forest Products Laboratory. This all takes time and the completed report is not expected for at least six months.

The causes of the first failure are known and, in order to place the facts before the public, the accident report follows. This report is extracted from the Canadian Department of Transport, Civil Aviation Branch, Summary Accident Report #555. The only deletions are the names of the persons involved.

Aircraft: L-K 10A, 2 seater sailplane. CF-ZCH.

Place: Brantford Aerodrome, Ontario.

Date: 5th September, 1958.

Resume: About 1215 hours on the above date, the glider took off with pilot and passenger on board, behind a DH 82C towplane.

The glider was released by its pilot from the tow aircraft about 2,000 feet above the ground and shortly thereafter he eased the stick forward to gain speed and performed a loop. As he recovered, a loud crack was heard. The right wing parted in flight and the aircraft descended to the ground in a flat spin. The pilot and passenger were seriously injured and the aircraft damaged beyond repair.

Investigation and Evidence: A board of inquiry was convened under the authority of the Minister of Transport.

The pilot-in-command held a valid Glider Pilot License and had accumulated 132 hours, 20 minutes glider flying experience, 57 hours of which had been flown on the L-K 10A glider, 3 hours in the 90 days previous to the accident.

A Certificate of Airworthiness had been issued for the aircraft, Its all-up weight was 23.5 lbs. under the maximum with the center of gravity within limits. Weather was not considered a factor. The glider had flown a total of 774 hours since new, 612 hours since overhaul.

The right wing settled about 200 yards northwest of the main wreckage. This wreckage made only slight marks in the direction of the spin on the runway where it came to rest. The main spar of the right wing had failed upwards about 4 feet from the fuselage attachment point and where the drag spar attaches to the main spar. The fuselage in the cockpit area was destroyed, the left wing was virtually undamaged with only minor damage to the fin, rudder and elevators.

An examination of the broken main spar indicated a pecularity in that the lower spar poom of solid spruce had an unnaturally sharp break. Parts of this wing were therefore sent to Ottawa for Laboratory examination.

This examination indicated that the wood was indeed exceedingly brash to the extent that its brashness value, or ability to withstand sudden load, was approximately 30% of the minimum specification figure, while samples of the top boom material and a spruce sample of similar age gave figures well in excess of the minimum specification figure. While the low brashness figure could be attributed to fungus because evidence of fungal filaments were found, no evidence could be found that this had been originated or activated by any condition of the wing after its manufacture. It was concluded that this brash wood was built in during construction in 1943. It was then decided to ascertain what effect this condition might have in reducing the ultimate breaking strength of the wing under load.

N.R.C. Report LR-238 gives details of the tests which are very briefly given here. To form a basis for comparison, the left wing from CF-ZCH was statically tested under up-load conditions to destruction. It failed between 6.5 to 7.0 g which is in excess of the design limit load factor of 5.7 g at 126 mph. Applying the reduced strength figures to the right wing gave three possible answers. By logical reasoning, it can be fairly stated that, despite the poor material in the starboard wing spar, the load required to make it fail probably exceeded 5 g. This figure, while well below the design failure criteria, is sufficient to indicate an overstress condition was reached during recovery from the aerobatic manoeuvre performed by the pilot shortly after his release from tow.

A further contributing cause to this possibility was the fact that a required elevator travel restriction had not been carried out on this aircraft, thus permitting excessive movement of the control column. (Item #6, TG-4A Service Bulletin #1, limiting elevator deflection to 15 degrees up travel.)

Conclusion: The pilot-in-command allowed the build up of "G" forces during recovery from an aerobatic manoeuvre sufficient to cause failure of the right wing. This force was below the design failure point for the structure which had been weakened by the incorporation of brash wood during construction. The value of this force was not exactly determined but probably exceeded 5 g. (End of Canadian report.)

It is considered that the above accident was made possible by two things. One the obvious manufacturing error of using under strength wood in the RH lower spar cap; the other, the failure to incorporate Item #6 of TG-4A Service Bulletin #1. Item #6 required that the elevators be limited to an up-elevator travel of 15 degrees by adjustment of the elevator cable system stops. L-K owners are advised to assure themselves that their ships are so rigged.

In addition, concern on the part of L-K owners as to the condition of their wings can only be satisfied by a complete examination of the structure, including the interior of the D-tube, for any signs of deterioration, joint separation or damage. There is a non destructive type "micro" impact test that could be carried out on critical parts of the wings for a determination of the basic wood strength, thus indicating the airworthiness of the structure. However, the equipment and tech-