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## *Structural Deficiencies* OF GLIDERS

The following paragraphs are observations made at the 4th Annual Western Championship Soaring Contest. The writer must remain anonymous, but we wish to inform our readers that he is a qualified engineer and glider enthusiast whose opinions should be respected.

Quite a number of defects were observed among the many gliders which took part in the 1941 contest at Arvin, California. Many of these are easy to correct and all should be studied for future improvement. Suggestions do not apply to any particular make of glider or sailplane. By studying and following these suggestions, and others like them which may come from other sources, glider operators will establish a better safety record and help to promote the popularity of gliding and soaring. The following are only a few outstanding items of many that were observed:

1. Many control pulleys, used at points where the control cable was required to make a 90° bend, were much too small. The result was that control cables showed evidence of fraying with as little as only 35 hours of service. Much larger pulleys should be used in the control systems of most gliders.

2. Considerable play was apparent in the lift strut fittings of many gliders. Such play can become dangerous if allowed to continue, especially if the glider is operated in very rough air. A remedy is to use larger pins through the fitting, or taper pins that can be seated tightly despite some wear. Shock loads on the fitting holes tend to enlarge the holes when pins are small, even though the pins may possess far more than the required strength. Larger pins provide greater bearing area in the fitting, with lighter bearing loads and reduction of the hammering effect which tends to enlarge all such fitting holes. It must be remembered that much of the strain on these fittings occurs during take-offs and landings on rough ground where rocks and ruts are encountered.

3. Most gliders need more longitudinal stability. This is particularly true in connection with airplane towing where porpoising can become violent and dangerous both for the glider and the tow plane. It is also vital in the landing condition, especially if the landing area is restricted or the pilot is not experienced.

4. Some gliders are still being flown without a forward skid. It is essential that all gliders have a forward skid to prevent nose-over. The only glider at Arvin this year that did not have a forward skid nosed over. Gliders with a forward skid can "get on the nose" in a landing and stop very quickly by throwing most of the weight of the glider on the forward skid.

5. Control cables should generally be heavier to reduce the deflection of control surfaces in quick maneuvering or rough air. Even cables that exceed the required strength for operation of control surfaces may stretch appreciably in quick maneuvering. A larger cable will restrict this deflection appreciably.

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The foregoing paragraphs serve to emphasize what has oft been said on this page before. Many pilots are not conscious of the deficiencies of their gliders. They risk life and limb in equipment which has not been properly designed and constructed and although their equipment stands up under normal conditions, an occasional abnormal condition reveals the structural weakness, at the same time causing death or injury to the pilot.

It would be well for all owners of motorless craft to inspect their gliders frequently and should a defect or possible defect be noted, such as elongated fittings, excessive control wear, or the misbehavior of the ship in flight, a thorough inspection of the ship should be made. If the condition is such that normal adjustments or replacements do not correct the fault, an experienced aircraft mechanic or engineer should be consulted.

Now more than ever the public and official eye is on the soaring movement and it behooves all of us to keep our record clean. The CAA inspectors are now becoming more and more familiar with gliding and soaring and their interest and help should be encouraged by the soaring fraternity. Their job is not one of policing but one of giving aid and advice to those with less knowledge of aircraft structure.

Let us all heed the warnings above and investigate the structural deficiencies as outlined.