

USE OF THE GURNEY FLAP PRINCIPLE

by Dave Stott

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In a past issue of *Tai/spin*, Tom Nallen Sr. told us of how race car owner/driver, Dan Gurney, improved the effectiveness of the aerodynamic spoiler on one of his cars by attaching a right angle to the trailing edge, one flange of which was protruding upward into the air flow. This odd move provided a great improvement in the downward force created by the spoiler. Some readers may also recall rubber-powered endurance model flyers fine tuning the trim of their models by adding a short length of 1/16" sq. balsa to the trailing edge of the desired surface.

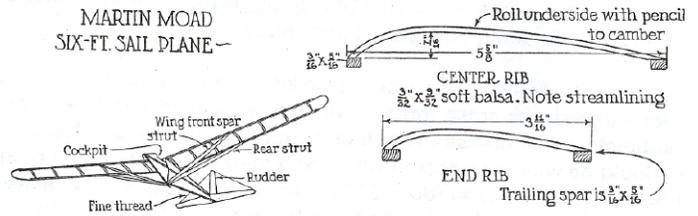
An entire season was spent by the author in trying to get a Scientific 20" Kawasaki biplane to stop dropping its left wing under power. There were no warps, and alignment was perfect. All the usual corrective measures, short of detaching the bay struts and warping wash-in to the left wing, were tried without success. In desperation, a much loathed and extremely large clear tab was added. This got the model to fly in a manner that could only be termed "acceptable".

Enter the Gurney flap! A 3-inch length of 1/16" square was tack glued under the trailing edge of the lazy wing and the offensive tab was removed. Presto! Problem solved. You have to admit, a piece of 1/16" square on the bottom of the trailing edge and painted the same color as the wing is much more unobtrusive than any tab.

When one considers the outstanding and perpetually good performance of the traditional simple ROG stick model, could it be because of the Gurney flap effect which was accidentally a built in feature of the wing structure of these old favorites? If you think about it, it is present. The single surface cover of the wing with the exposed square trailing edge on the bottom is, in effect, a Gurney flap. The usually lesser performance of the ROG equipped with an all sheet balsa wing has always been attributed to its added weight. This is undoubtedly a factor. But, could the lack of that square trailing edge protruding down into the air flow as found on the built up tissue covered wing also be a significant contributor?

The author once built and flew for many years a truly accurate reproduction of a very old tow line glider. It was designed by a youth named Martin Moad and published in a children's book of model airplanes in 1933. The wingspan was 6 feet. The aspect ratio about 7.8 to 1. It was a single surface covered wing! The leading and trailing edges, as can be seen in the sketches, were enormous and square in cross section. Only a slight rounding of the corners of those members was called for. Rib spacing was a whopping 5 inches! In spite of the terrible looking airfoil this structure created, the performance of this model was flabbergasting! In competition it proved itself over competitors 15 years more modern, such as the Jasco Trooper. Another faithful repro was built by fellow modeler, Tony Faranda, and flew just as well, establishing a lack of fluke being involved. Tony was such an expert in trimming hand

launched and catapult gliders that he was nicknamed "Dr. Schweitzer, the Glider Doctor".



The exposed trailing edge of the models discussed here certainly seem to produce the Gurney flap and its effect. What are the side affects of its use? What is the best wing chord/Gurney flap height ratio? Does it cause an increase in drag? Is it great enough to cancel its benefit? Does the Glue Guru have an opinion on this? Should any of us do further experimenting with it? *Tailspin* is certainly the place to discuss it further. Let's keep Mike and one another posted, clubsters.