

# LETTERS TO THE EDITOR

## How Many Towplanes?

Sir:

For years now, whenever the question has been raised as to how many tow planes were needed for a contest a figure such as "one plane for every five entrants" or "one plane for every six entrants" has provided the answer. Now the rule has been set up for the 1966 Nationals that there will be no more than five entrants for each tow plane. But is this a logical way of doing things?

Let's look at a typical launch at a large contest such as the Nationals. A tow plane is lined up with a sailplane behind it ready to go. At the moment his wheels start to roll we start a stop watch. As the first tow gets out of the way a second tow plane is taxied into position, hooks onto the sailplane and takes up slack. When this combination starts to roll we stop the watch. Under ideal conditions this operation can be performed in about 45 seconds. Think about it a minute and you will see that this then is the limiting factor as to how fast sailplanes can be launched from one line. (And there are not too many places in the country where two lines could be operated simultaneously.)

Move on and look at the operation of the tow planes. I think that most would agree that a tow plane can take off, tow a sailplane to 2,000 feet and return to the ground ready to go again within six minutes. If we have eight tow planes they can launch eight sailplanes in six minutes. Lo and behold, this turns out to be one off every 45 seconds, the same figure we had above. Now let's double the number of tow planes. We still can launch only one sailplane every 45 seconds and each tow plane can still make the round trip in six minutes. So what happens is that we have eight tow planes waiting in a line for their turn at the starting line.

Taking the figures above we can then say that eight tow planes can launch an infinite number of sailplanes at the rate of one every 45 seconds. None, nineteen or ninety tow planes would not speed up the process one bit. Looking back at the day at Adrian when 65 sailplanes were launched in 48 minutes, using eight tow planes, we come up with a launch interval of 43 seconds. How close can you get?

So the rule for the 1966 Nationals is not based on accurate thinking. Under this rule fifty entrants would require ten tow planes, but we have seen above that eight tow planes can take care of any number from 48 on up.

If it becomes necessary to limit the number of entrants in the 1966 National Soaring Championships to some such number as 60 or 70 this will have to be done, but don't require the Nevada Soaring Association to provide 12 or 14 tow planes. It might be a little hard to come by this many tow planes and it would be utterly unnecessary. Also if the entries are limited let's come up with a better reason than the one about not enough tow planes being available.

MARION C. CRUCE

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★ Sterling Starr, Chairman of the Contest Board, replies:

There are four considerations that govern the number of competitors which can be accommodated at a large contest such as the Nationals. These include the desired total time to launch all competitors, the launch rate as limited by ground-handling operations, the time required for a towplane to complete a 2000-ft. tow and return to the next hookup, and the number of towplanes. The relationships between these parameters are illustrated in the enclosed chart.

In intense competition the takeoff time of day can be quite critical in determining relative scoring. In order to reduce this factor to a reasonable value, it is desirable to have the capability of launching all competitors within approximately one hour of the first launch. Recent experience at National contests has indicated that launch rates of between 45 seconds and 60 seconds per launch are achievable. At Adrian 45 seconds was demonstrated several times. From the left side of the chart these launch rates and the one-hour-total-time restriction yield a limit of from 60 to 80 competitors.

The tow time is a function of towplane excess power and field elevation. At Adrian six-minute tows were quite reasonable to expect, and were demonstrated. At the 1965 Western Regional at Minden, average tow times more the order of 12 minutes were experienced, as to be expected with a 4700-ft. field elevation and warm temperatures. As shown on the right side of the chart, a one-hour-total launch time and 12 minutes per tow yields a limitation of five contestants per towplane.

Since the Reno bid for the Nationals presented a list of twenty probable towplanes it seemed reasonable to expect that twelve to sixteen would finally be available for tow, yielding a limit of from 60 to 80 competitors from the standpoint of towplane-time-per-tow capability. Since this number is quite com-

patible with ground-handling-launch-rate capability of from 45 to 60 seconds per launch, the ground rule of five competitors per towplane was established for the 1966 Nationals. Both the number of towplanes and the launch-rate capability at the field will be examined to ensure compatibility when the competitor limitation is established April 28.

STERLING STARR

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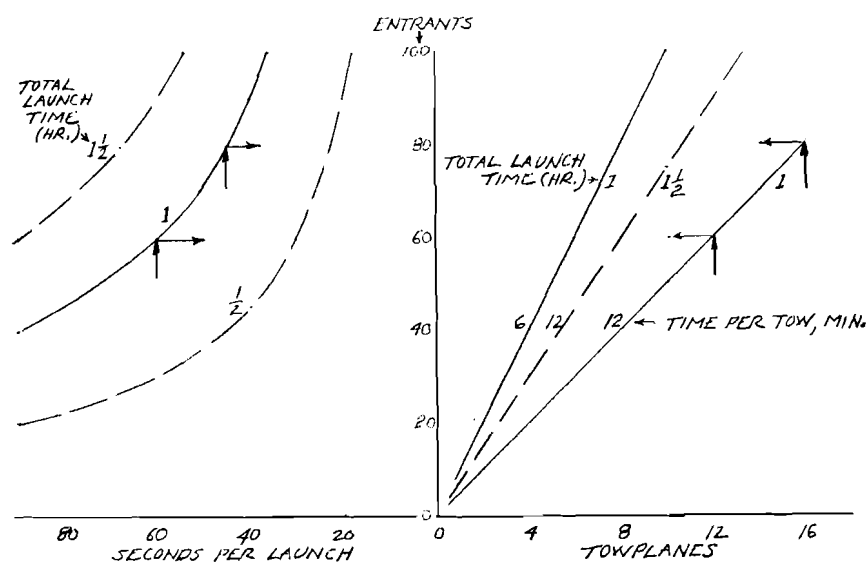
## Speeds in Rough Air

George B. Moffat, in his article on "More Modern Sailplanes" in the March issue of "Soaring" says: "A study made a year or two ago in England indicated that most sailplanes were reasonably safe at speeds up to 20 m.p.h. less than the smooth-air placard but fairly unsafe at the placard speed in strong turbulence." Since I was responsible for the document which came to the conclusions neatly summarized in this sentence, I thought some further explanation was required before the skies of the U.S. are darkened by a drizzle of dismembered sailplanes.

The original context of my paper was that of giving advice to competitors in the last-but-one British Nationals. In previous contests, various competitors had been seen crossing start and finish lines at the placard speed if not more, presumably on the theory that gliders are much stronger than you think. The consequential wing deflections were sometimes quite awe-inspiring. Moreover, some of us had memories of two fairly alarming incidents: the Kranich III which achieved flutter in Spain in 1952, and the Skylark III which shed a wing in Argentina, having apparently exceeded the placard speed somewhat.

I therefore did some calculations based on gliders designed to the 1961 edition of British Civil Airworthiness Requirements, Section E, operating in the turbulence conditions suggested by Zbrozek in R. & M. 3216 ("The Relationship between Discrete Gust and Power Spectra Presentations of Atmospheric turbulence, with a suggested Model of Low-Altitude Turbulence"). This "model" re-

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CONTEST ENTRANT LIMITATION CRITERIA