

# *Hand Towing R.C. Sailplanes.*

*by Klaus Weiss*

Further on from my *Launching Sailplanes for Beginners*, in issue # 190, I will expand a little on a couple of the methods used for launching your model glider.

Hand towing is probably the cheapest and one of the easiest methods used, for getting a thermal glider into the air. Only drawback is, that you need someone else along to tow the model up the line.

Hand towing is also an interesting way to launch sailplanes. People may think that hand towing requires a degree of fitness and running ability, but this need not be the case at all.

When launching a glider off a high-start, you stretch the rubber and monofilament line to the point at which you want to launch. For a 2 metre span glider, that would be around 80 – 100 metres from the relaxed position of the high start. You can feel the line tension on the high-start before you launch the sailplane.

When hand towing, you don't need to pull any more tension than what you feel on the high-start, in fact I would err on a little less tension, so physical strength isn't much of an issue.

With a good breeze, you can keep the model on a high-start by weaving from side to side. The high-start stretch stays uniform, and the end of the line doesn't move. It works the same way for hand towing. With a breeze and a line with some stretch, you can stay on the line while the tow man stands in one place, or walks slowly, to maintain the same amount of tension in the line. He may even have to walk back towards you, if the breeze is strong.

Be aware that this method can be an aggressive way to launch a glider and if care isn't taken, a tower can produce more than enough line tension to snap even the very strongest of wings. I blew a wing apart during a contest in May 2003, when the glider was hit by a stronger than normal gust, just prior to pinging off at the apogee of the launch.

## EQUIPMENT

In F3J competition, high performance is important, so a large, high-aspect-ratio model is a good choice. Some of the larger, less expensive, Open Class thermal duration gliders ships would also perform quite well in F3J. They are light, strong enough for hand towing, and they land very well.

Use monofilament line for the towline. It stretches more than braided lines. If you're flying a 'floater' type sailplane, such as an Olympic II or Spirit 100, you can use line as light as 27 kg breaking strain. The lighter line has more stretch and less drag during tow. For larger models and stronger wind, consider line up to 68 kg test. We normally use 54 kg line, in the Millennium Cup 2m span glider competition, but could safely go down to half of that. For Open Class or F3J I would use 68 kg or so, if the wind were strong. More than 45 kg of pull from the model is needed to break a 68 kg test line.

A strong wind can make it a challenge for the tower to hold on to the line. I have seen a couple of our guys stopped in their tracks, by the pull from a 2m span model, so you could imagine the force generated by a 3.5 – 4m model.

In F3J, the models are generally 3 metres + wingspan, made of Fibreglass/Carbon fibre/Kevlar construction, and tremendously strong. The lines used are around 64 kg breaking strain, and are regularly broken by the tension built up during launch. Pilots stay on the line less than 10 seconds, and achieve launch heights of 180 metres plus. Of course, this isn't possible with balsa, built up models, such as those the beginner pilot will be flying, but, good height can be gained by them none the less.

The official line length for FAI competition is 150 meters. In the Millennium Cup 2m series, we have come to an agreement to standardise the line length at 200m from the turnaround, to the pilot. This means we have 400m of line, total. We also use a reflex pulley system, which means we can generally get 150m to 200m+ launch height.

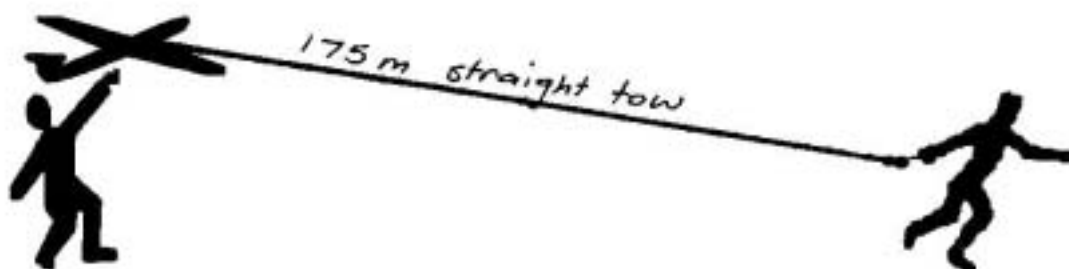
To store the tow line, all you need to do is roll it up onto a plastic reel, similar to those supplied with electrical cable.

## COMMUNICATION

Communications between the tow man and the pilot are critical. You'll need to establish two signals: one to tension the line and one to start towing. Raising a hand or the model on the line, might be a signal to tension the line, and then lifting the model up and down a few times, is a good signal to start running. Allow the tow man to build some line tension before you throw the model. You should throw it firmly to avoid stalling at the start of the launch. The model will rise just as if it was launched from a high-start. Plan your release from the tow line, before you fly over the tow man's head. I usually start to zoom from a hand tow in wind, when the model is about 60 – 70 degrees from the tower, and get a pretty good ping. With a reflex tow, the towman is generally beside the pilot, or very close to him, so verbal communication is possible. If there is little or no wind, then a double reflex tow will get the model up with little fuss and not much loss of line. The important thing here, is to tell the tower to go faster or back off.

There are a number of variations available in hand towing

(a) There is the single man tow, which uses 175m of line (or 150m in the case of F3J) and a straight tow into wind.



*The single man tow is used in thermal duration competition. A hand reel and monofilament line is used.*

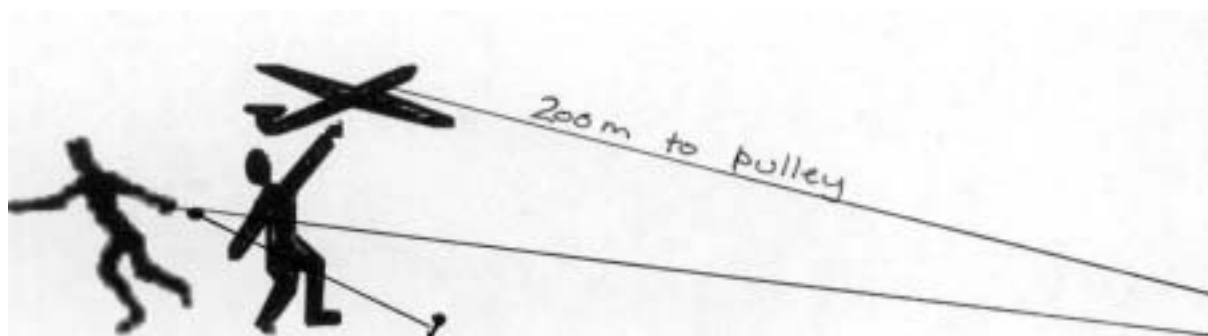
(b) The pulley tow, where the end of the line is staked to the ground, and a pulley is attached to it. A single man or two man tow is then possible, whereby for each metre travelled, the line is pulled in by 2 metres. This gives a very fast and powerful launch, one in which extreme care must be taken, as it can quickly lead to excess tension, which will blow a model to pieces. The disadvantage of this technique is that you quickly reduce the length of

the line, but the increased line tension accelerates the model upward during the tow and the increased velocity more than compensates for this loss. Using this method, you can easily launch a 2-meter model in calm air in 15 seconds. For the really aggressive types, the pulley tow can be used in wind. Use a strong model, strong line, and two tow men to pull. The pilots in the World Champs use this technique to launch their F3J models, but due to the inherent dangers of a stake or turnaround being pulled out of the ground, safety measures must be taken.



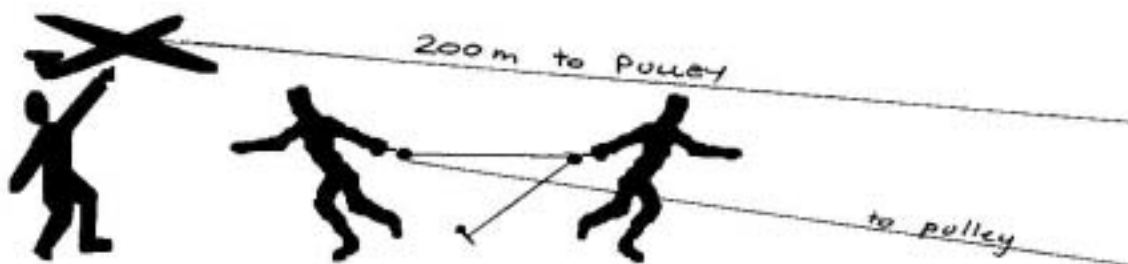
*In F3J two man towing, the pulley is attached to the line by a harness. This is a safety precaution in case of line breaks or the stake pulling out of the ground. The stake should also have additional restraining lines pegged into the ground. Tremendous tension can be built up using this method.*

(c) The reflex pulley tow is where the line is staked to the ground, at the pilots feet and the loose end taken out some distance to a turnaround pulley and back to the pilot. The pilot hooks up on the end of the line, and the tower hooks up on the ground line, next to the pilot. The pilot takes up tension by walking backwards, and calls out to the tower when he is ready to commit to the launch. If there is a breeze, the tower hardly needs to walk at all, and often has to take all tension off and walk back to the pilot. This is an effective method, as the two are always in voice contact, during the launch phase.



*This is the tow method used in the popular 2 metre span Thermal Duration contest – The Millennium Cup.*

(d) Double reflex pulley, is the same as above, except that there are two towmen hooked up to the ground line. They both walk in opposite directions during the launch, and a fast launch can be expected, even in calm conditions.



*Plenty of tension can be maintained by this system, even in light breeze conditions.*

Hand towing is easy, and it requires very little special equipment. Contests are easy to organize, because everyone supplies his own launch equipment, where the event calls for a single man straight tow. Get some club members, and give it a try. Flying in groups is always more fun.

With the Millennium Cup series, the committee supplies the equipment, and a single reflex tow is generally all that is required. The format for this very popular competition, can be found on the Heathcote Soaring League website, on <http://www.hsl.org.au> If your Club is wishing to become involved in this type of format, then contact the Secretary of HSL.

I hope I have covered the basics of hand towing. This article is aimed at beginners, so I apologise to those who already know all this information. Next time, I will cover a little bit of slope soaring.