The shape of now … there's no squashing this glider into a stuff sack. Photo: Bruce Goldsmith

by Bruce Goldsmith

Walter Neumark's vision

Rigidity in paragliders is not good – we need to think again, says Bruce

Most paraglider pilots will not have heard of Walter Neumark. He was a very influential figure in the early years of paragliding, and not so long ago he died in his eighties a happy man.

When everyone else was doing spot landing competitions in the 1970s and 80s, Walter was offering prizes for distance flying. The pilots at the time laughed at him, and Walter's distance flying trophy had distances of only a few hundred metres for more than a decade. But he insisted. He was a visionary and his dream was that paragliders would one day fly cross country as we are doing now so successfully.

AN ORIGINAL PIONEER

In 1954, Walter Neumark predicted in an article in Flight magazine a time would come when a glider pilot would be, "able to launch himself by running over the edge of a cliff or down a slope ... whether on a rock-climbing holiday in Skye or skiing in the Alps."

As well as having foresight Walter was also a very intelligent man. He was involved in the design of parachutes and inflatable aircraft from the time of World War II onwards. He also had several patents registered in the field of inflatable structures. He once told me of a 'top secret' project developed between the British and the Americans with Goodyear Tyres in the later years of World War II. It was a monoplane where the engine operated a compressor that inflated the rubber inflatable wings to high pressure.

The project was very successful, until one day an over-enthusiastic test pilot attempted a loop. The high G-forces caused the wings to deform so much that they touched the prop – and the wings actually burst. Because the fuselage was also inflated, the loss of pressure caused the fuselage to contract around the pilot, stopping him from ejecting successfully. He died and the project was shelved.

In his professional life Walter also worked on inflatable structures, mainly in the medical field.

In 1997 Walter Neumark was awarded the Royal Aero Club of the United Kingdom's gold medal. First awarded to Wilbur and Orville Wright in 1908 for their first successful controlled powered flight, it is one of the most prestigious awards an airman can get. The inscription for Walter reads: "Walter Neumark served paragliding for over thirty years. He advocated soaring with foot-launched ultra-light backpack gliders in 1953. He was the pioneer of paragliding, the founder of the sport's national governing body and a tireless worker within the RAeC and the FAI. His originality, foresight and commitment have helped to bring the joy of soaring flight to tens of thousands."

DEFINING THE PARAGLIDER

It was no surprise then that when the FAI had to define what a paraglider is, they came to Walter Neumark. It was Walter who wrote the FAI definition of a paraglider. He knew exactly what he was talking about when he created the definition, and the depth of understanding in his wording is really quite visionary.

The current FAI definition of a paraglider is: "Class 3: Hang gliders having no rigid primary structure (paragliders), and which are able to demonstrate consistent ability to safely take off and land in nil-wind conditions."

There has been much discussion in the competition scene as to what is 'rigid' and what is 'primary' (more can be seen on the PMA website at goo.gl/J2EBF). After many meetings the Paraglider Manufacturers Association agreed a clarification of these rules:

"Flexibility is defined by the ability of a component to be bent around a radius of 1cm by 180-degrees without being damaged. This test of flexibility will be executed in at least two perpendicular planes and will be performed when the component is integrated into the glider. Note: all Rigifoil materials and all Mylar reinforcements as used up until today in certified gliders will fit inside this definition."

So, the current situation is that the PMA excludes the use of carbon, but allows Mylar and plastic rods, but the FAI have to yet offer any clarification on this matter.

WHAT'S THE PROBLEM?

So what's the problem with rigidity anyway?

Most aircraft stay the right way up by having a tailplane (horizontal stabiliser). When the main wing stalls or gets in trouble (turbulence), the tailplane saves the situation by stopping the main wing from flipping.

In hang gliders the tailplane is replaced by luff lines, dive sticks and pitch rods. All these devices try to keep the wing the right way up by maintaining a positive pitching moment. Sometimes however, even hang gliders resort to the traditional tailplane as the other methods are less reliable.

Paragliders have pendular stability to stop them going upside down. This means the pilot hangs far below the wing, which keeps it stable above him. However, this is not enough in all situations. Sometimes the lines can catapult the wing below the pilot. When this happens the clever solution is that the glider collapses to stop the pilot falling into it. If the wing does not collapse properly then this safety mechanism no longer works.

If a paraglider needs to collapse as part of its stability mechanism, then it also need to be able to reinflate again following a collapse, without cravats or knots.

WHERE ARE WE AT NOW?

It is my opinion that the recent problems with competition gliders all come down to this important definition. The more rigidity you allow, the trickier the gliders become when it all goes wrong. The basic simplicity and forgiving nature of the paraglider is lost.

To me, recent events at the World Championships and in other competitions have shown that even the PMA definition allows too much rigidity and shows just how clever that original definition was.

Hats off to Walter Neumark.