

Paper airplanes



When I was a child, I loved a magazine called Children's Science. It was always exciting to me, and filled with new ideas. And there was always a new pattern inside for making a paper airplane. I remember impatiently waiting for the glue to dry so I could fly the latest paper airplane design. The designer of these planes was Dr. Yasuaki Ninomiya, who holds a Doctor of Engineering. He is now 72 years old, but as a boy he too was an enthusiastic reader of science magazines such as Children's Science, Sky, and Ocean and Sky.

"Even before I started elementary school, I can remember making paper airplanes from a box that had contained chocolates. The 1930s was an era of tremendous development in aviation and I was totally enthralled. In junior high school I belonged to an airplane club and got to ride on a glider and studied the physics of flying, as well as making paper airplanes. My interest just seemed to grow and grow."

In 1967, when Dr. Ninomiya was working for NTT laboratories, he participated in the first international paper airplane contest, located in San Francisco. He won the top prizes for flight duration and flight distance, and also won the grand prize. That same year he began publishing his designs for paper airplanes in Children's Science. Even today, after 31 years as a contributor to this magazine, he still writes monthly articles for it. But he claims his ability to come up with new paper airplane designs is based on knowledge he acquired in junior high school.

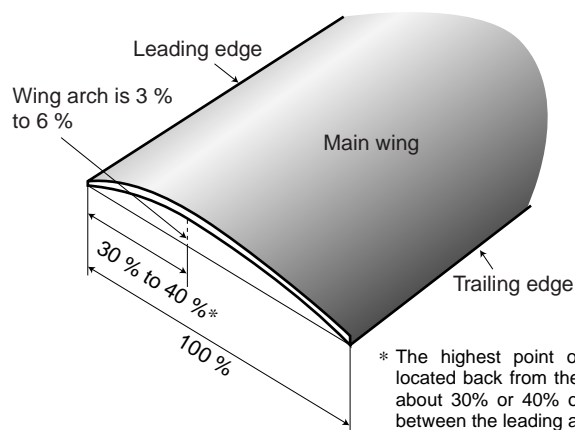
"For the body of the plane, I used several layers of tagboard to avoid damage and make repairs easier. I already had this idea when I was in junior high school, although I thoroughly refined it later based on extensive experimental data. A paper airplane has a different design from a real airplane, because it is affected by 'sticky' air. For example, the wings should not be as thick, as thin wings are far more aerodynamic for paper airplanes. Based on my experimental research, I determined that the optimum distance from the leading to the trailing edge is 3 cm. And for a speed of 5 meters/second with the best ratio of lift to gravity, the main wing should be extremely thin and arch 3% to 6%. But even after 30 years, I'm still working on new theories and experiments to improve paper airplanes." To perform experiments and gather data, Dr. Ninomiya flies paper airplanes in the calm morning hours at Tokyo's Musashino Central Park. After hooking a rubber band to the top of an airplane, he launches it with

a slingshot. It quickly rises 20-30 meters, and then for the next 20 or 40 seconds it travels quite slowly. If the airplane catches a wind current, flight duration can be as long as ten minutes. Watching a paper airplane slowly glide through the sky can make you feel like you're the one flying, the best part of flying paper airplanes.

"You have to experience this aspect of flying them before you can truly understand the joys of the paper airplane. If we were to fly a paper airplane using virtual reality, it wouldn't be interesting at all."



Dr. Ninomiya said he often gets out to watch the flight of paper airplanes. His paper airplane designs have been exported to many foreign countries and today they are flying all around the world.



* The highest point of the arch is located back from the leading edge about 30% or 40% of the distance between the leading and trail

This is an idealized design for a paper airplane