

GLIDING ACTIVITIES IN CHINA

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1. INTRODUCTION

In our ancient history, it is stated that:

- During the years of Emperor Wang Mang (9-23), a man "flew several hundred steps and dropped." Our historian regards this man as the pioneer of gliding.

- Ge Hong (284-364), a Taoist, explained that an eagle flew and gained height with its wings stretched owing to an up current. We take him as the initiator of the soaring theory.

We are proud that we have good foundation from our ancestors.

But, in modern history we suffered a period of four different political districts. From the point of view of a historian:

- The earliest organized gliding activity was in the Northwestern part of China, which was called Manchuria at that time, being introduced by a Japanese instructor, in 1936.

- The earliest amateur gliding pilot in China was a German, Mr. H.K. Haeusing, who was a consultant in the Europe-Asia Airlines. Under his instruction, two gliders were built and flown in 1936-1937.

- Honored as "The First Man of Gliding" in China is Mr. Wei Chao; he learned soaring in 1936, in Germany, worked very hard and spent the rest of his life initiating gliding in China. The peak of activities was from 1941-1945.

- The highest and longest flight was made by a Belgium pilot who

soared to a height of 1,800 m and attained an endurance of 4 hours and 40 minutes in a demonstration 1940 in Chungqing. It was said to be breaking the existing Eastern Asian record at that time.

- The earliest Flying School of The People's Liberation Army, 1948 in Haerbin, built two gliders for use in pilot training.

A great expansion of gliding occurred in the fifties and sixties. It then stopped for a decade, unfortunately, but was subsequently resumed with the technique of soaring advancing steadily.

Thus, we have experiences both encouraging and discouraging. As the International Gliding Commission (IGC) is thinking of improving Gliding Sport generally as well as promoting gliding in those 70% of the 175 countries who ignore it, we try to discuss in this paper our experiences from 5 decades of gliding activities, and also the recent work in reforming and popularizing the sport as Early Flight Education. It might not be new in a developed country, but, in order to take care of the other 70% in addition to investigating new advances, perhaps studying the case of a developing country might well be useful.

2. GLIDING AND AIR POWER

Gliding activities in China were started much later than the establishment of the Airlines, Air Force and aviation industry. A few details on Mr. Wei Chao, since he was the First Man of Gliding, may give a brief background of its development.

Wei Chao was originally sent in 1933 by the Government to study airplane design and manufacturing in England. In 1936, when visiting Germany for the World Games, he was astonished by the superb demonstration of a large fleet of gliders in Berlin. He found that a glider could make any kind of aerobatic maneuver that an airplane could do, yet it was much simpler, cheaper and safer. He understood that a powerful German Air Force had been established quickly and successfully with mass gliding, despite the restriction of the Treaty of Versailles (1919). Thus, he realized that a similar way could be effective for China to protect against an invader. So, he decided to learn gliding there, graduated half a year later and hurried back.

After much persuasion, Wei Chao obtained the support of Da Gung Press in Tianjin with 3000 DM from The Airplane Fund For Saving The Country to buy a German sailplane Rhonsperber, which was scheduled to arrive in Shanghai in 1937. But, unfortunately, the Northern and Eastern part of China being attacked, the sailplane had to be transported through a difficult and long mountainous journey in Southwestern China, and finally arrived at Chengdu in 1939. Demonstrations in Chengdu and the temporary Capital, Chungqing, drew crowds of tens of thousands and gliding and aviation became widely known among the public. The Rhonsperber was named after the Da Gung Press as "Da Gung Pao Hao."

With Wei Chao as the director, classes for instructors were started in 1939. Unluckily, the beloved Wei Chao died at his post as a result of a mishap in 1940. Yet, his enthusiasm was carried on. About 58 men and women instructors graduated in 1941 and 1942. They were sent to set up new gliding sites.

In 1941, the Chinese National Gliding and Flying Association was formed and was sponsored by the Air Force and the Department of Education. Funds for buying gliders were raised, which together with donations from the public, were sufficient for 763 aircraft, of which 100 were finished by December 1942. The number of Gliding Clubs then gradually increased to six. Middle school and university students were eager to learn gliding in part-time or summer camps. The total number of attendants in 3 years was 2218, not including the students in The Gliding Division, The National Youths Air School, where every Senior Grad 2 student can learn gliding once a week. The courses for basic training in a one month period was "takeoff and landing" and "straight and level flight," using Dicksons catapulted on level ground by bungee cord or even a giant bamboo bow. Some of the clubs built a platform of 15 m above ground for launching. Some platforms were built on hill sides at 150 m height for launching H-17's, making flights of three minutes possible. The highest platform built was at 350 m after catapult takeoffs some good flights of 10'20" were achieved. Airplane towing was also used for launching. An H-17 was fitted with floats and landings on a river were tried.

3. GLIDING AND DEFENCE EDUCATION

Gliding was started again at the initiation of the Chairman of The People's Republic of China shortly after its formation. Flights were made with Dicksons and H-17's by car towing in Chengdu Gliding Station in 1953. Students were also being trained in weekends and summer time, while aeronautical education was offered by the instructors as an extracurricular activity. Gliding was planned to expand as one of the events in Defensive Sports, which also includes aeromodelling, parachuting, motorcycling, shooting, yachting, etc., following the experiences of other countries.

We found that Poland was very active in gliding when we saw the gliders in Expo, and an interesting film "The Beginning of Flying." The first two Polish experts, who visited China according to the science and technology cooperation agreement between both countries, were Prof. Humen and Dipl. Ing. Nowakowski. They

helped me to make a long-term plan of development, including: establishing a gliding school, supplying gliders, establishing a glider factory and training Chinese pilots in Poland. Next year, 1955, the first instructors were trained by the Polish experts, introducing a brand new system with winch launching to a height of 300 m, from which the glider could make a complete circuit of takeoff and landing. The towing cable, after being released from the glider, is quickly pulled back to the take off area by a retriever, ready for another take off. After soloing in the primary glider ABC-ter and secondary glider Salamandra, the student was taken up in the two-seater, Bocian, for spin training, and was then checked to solo in a single-seat sailplane, Mucha-100. The sailplanes were launched by airplane towing.

With instructors being trained and gliders appearing at the same time, new gliding clubs were formed, 47 within 6 years. Many boys and girls were trained to solo in gliders, as well as the cadets of the Air Force and Navy Air Force before airplane training in air school.

There had been some developments in training during these years. In primary training, the Polish system trains the student with a single-seat glider right from the start, progressing gradually from hopping to flying high. Its advantage was to fortify brave and self-confident new pilots. However, the Chinese instructors were used to starting training in a two-seater, which is much safer. They made lots of experiments with a modified two-seater from ABC-ter and finally with a design incorporating the Salamandra wings and a fuselage similar to JIEFANG 2 by an engineer in Chengdu Gliding Club, in 1960. This new two-seater called JEIFANG 5 was put into mass production by Shengyang Sailplane Factory.

In our search for a better way to integrate gliding activity with the normal school curriculum, we tried the following:

- When gliding clubs were near the city, students from various schools took gliding after class.

- When gliding clubs were farther from the city, students who engaged in gliding were gathered in one class in one school and their gliding and normal curricula were arranged jointly.

- In Beijing, they tried using a Tiny Catapult, JEIFANG 6, to give catapulted gliding to interested students and chose more competent students to get basic gliding training in the gliding clubs in summer time. But the catapulted flights were too short and not interesting, so later, we developed JEIFANG 2A to incorporate a high lift device. It could stay much longer in the air and glide some 60 m. But it came too late.

- The final form was gathering students with competent flying qualities, especially good health, to live and study in one school near the gliding site, so that both gliding and normal high school education could be well arranged, and at the same time, good nourishment and physical training and particular care could be given, which was something special in the case of a developing country.

During the mid-sixties when Chinese new 285 hp basic trainer T-6's were in mass production the older 160 hp T-5's were given to the gliding clubs. Those students in the "gliding (high) school" were intended to be given further flight training in airplanes also. But, unfortunately, all activities were then stopped completely. In the late seventies, only gliding and "gliding (high) school" were resumed for several years, but before the former standard was regained the students were not so much welcomed, and gliding training was dropped again.

4. EARLY FLIGHT EDUCATION

When the activities of the Chinese Society of Aeronautics and Astronautics resumed in 1979, we, the Committee of Popular Aviation, JSAA/NSAA, started to consider the appropriate Aerospace Education for youngsters of all ages. We started with com-

prehensive aviation summer camps for teenagers, including air experience flights in big airplanes. To promote flying has not been easy, because the parents were doubtful to its safety.

In summer 1985, after collecting the opinion of students (97% in favor of flying), a class of 10 students from Nanjing Aeronautical Institute, sponsored by the Institute, were trained to glide in JEIFANG 7 by the Jiujiang Aeronautical Sports School. 9 students were soloed in about 70 circuits and landings. These engineering students were so much delighted that many others became enthusiastic. Next year, 22 students from Aeronautical Institutes all over China were trained in the summer camp in Liaocheng Aeronautical Sports School, organized by CSAA. Circuits and landings were about 20 for each student. In summer 1987, this kind of flying summer camp was extended to include middle school students also, but with fewer circuits and landings. A total of 86 students attended.

In the aforementioned activities, we collected enough information to draw the following conclusions:

- Gliding is cheaper and more efficient in the initial period of flight training — about 5 to 6 yuan/circuit of three minutes, and as many as 3 gliders can be airborne at once when the students get familiar and shorten the ground time enough, enabling a total of 110-120 circuits to be made in one takeoff area per half day. For setting up new clubs, a modern motorglider may be even simpler to operate. Therefore, gliding is ideal for giving air experience to many more teenagers for the purpose of: either popularizing air education, or choosing the future competent young pilots. The broader the base for selection, the better will be the quality of ultimate pilots.

- A glider has 3 axes control, just as an airplane, so there should not be harmful bad habits with proper instruction — there had been an argument that primary glider training would make the student rough in control and form bad habits difficult to correct. We investigated this especially in 1985, and were reassured that it was purely a matter of adequate instruction being given.

- Starting flight training at an early age can give more years of service life — according to ICAO and British regulations, the minimum age for pilot license: glider is 16 and airplane is 17. Usually boys and girls were trained earlier and allowed to go solo on his/her 16th birthday. It is said that in Germany solo in a glider as early as 14 is allowed by the signed permission of an instructor.

- Since Chinese students have much less opportunity, such as driving a car, than in a developed country, early flight education can help develop the senses of speed, prompt reaction, coordination, and other psychological factors essential for building up a good pilot.

- Making good use of the available summer vacations before entering a flying institute, a competent student may have enough time to learn gliding/soaring outside class with the support of scholarships, offered by a Foundation and earn some 45 hours or more flight time. Here, too, had been arguments: some believed in straight flying training in 1 or 2 types of gliders and other think that a simulator can be substituted for part of the flying. But our practice and experiences have proved that a glider pilot with about 97 circuits experience could be trained to solo in the T-6 in about 15 flights/1.03 hr. on average, and a sailplane pilot with cross country experience needed much less additional training before soloing and cross country flying a 1000 hp Y-5. We also found that experience with more types of aircraft was helpful: a jet test pilot once encountered an engine quitting at 8000 m. He did not leave the plane but calmly treated the jet as he had learned in a glider and made a successful forced landing.

- Logging flight time in glider/sailplane also counts — this is also proved by our practice. Therefore, early flight education with gliders not only shortens the training needed for powered airplanes, but also counts towards total flight time. We have noted that this is

already officially specified in Federal Aviation Regulations of U.S.A. For instance Part 61.129 includes "(b) flight time as pilot. An applicant... must have a total of at least 250 hours of flight time as pilot... The total flight time as pilot must include - (1) 100 hours in powered aircraft, including at least - (i) 50 hours in airplane, and ..."

That means the rest of the 250 hours can be made up of other aircraft including powerless gliders.

- For the moral part of education, activities of early flight education, as part of the early aerospace education, can help build up love of aviation, patriotism, leadership, physical condition, etc. the Air Training Corps. (U.K.) and the Civil Air Patrol (United States Air Force Auxiliary), both were formed in 1941, during world War II, and have remained active ever since. They think such activities can also help foster good citizenship.

5. COMPETITION PROMOTES DEVELOPMENT

Advanced gliding in China was also strengthened by the Polish experts. One of the first 4 classes in 1955 comprised experienced airplane pilots, so they took up acrobatics in a glider very quickly and a formation of 9 sailplanes took part in the Celebration Parade in May 1, 1956, over Tian An Men in the Capital Beijing.

Soaring information were also being prepared by a well-known Polish pilot in 1955. He took an airplane to survey the thermal and other upcurrents prevailing over the hilly district Zhangjiakou, where the newly established National Gliding School were situated. Next year, 8 of the best young pilots were sent to Poland for advanced training. In China, endurance and gain of height flights were practiced. Cross country soaring increased when the National Gliding School was moved to Anyang, where it is now, on flat land. The best achievements in the sixties were: 412 km distance and 9:10 hours duration. As to competition, we tried in the First National Games, 1959. As in other countries, pilots in competition were less than 10% of the total. They became more active when our national organization the Aeronautical Sports Association of the People's Republic of China joined FAI in 1978. Since then, we have had much technical exchange with the United Kingdom, West Germany, France, Australia, Japan, etc. and have started to participate in the World Gliding Championships beginning in 1987.

We have also developed new soaring sites, for instance:

- The Helan Mountain in Ningxia Province, very high and perpendicular to the strong northwest wind, produces very good waves, in which a Chinese record of 8,190 m in height gain and 11,117 m in absolute altitude was made.

- The Jiayuguan (Jiayu Pass) after several years exploration, was chosen as a new base, where the Friendship Gliding competition between China and Australia were held in 1987. There, a Chinese record of 149.82 km/hr in a 100 km triangle was made on July 24, 1987. A record of 513.375 km in goal and return distance were also made.

Jiayuguan City is located at the middle of the "River West Corridor" on the ancient Silk Road. The well-known Dunhuang wall paintings and giant stone sculptures are nearby. Less than 50 km to the south, the Qilian Mountain runs from east to west for about 700 km with white topped ridges of 5500 m altitude. Owing to excellent visibility of more than 50 km, one can often see that cumulus over the ridges have been formed as early as 8-9 o'clock in the morning. Sunny days are frequent. Hours of sunshine are long. There is railway and road access. The flat portion of this district, about 150 km wide and more than 1000 km long, is made up of small stones, Gobi, and some deserts, which give very strong thermals of an average of 4-5 m/s. It is consistent with the information from foreign satellite reports that there are very strong and broad thermals up to 6000 m over the highlands of Northwestern China. From June to August is the best soaring season. A pilot has designed a route

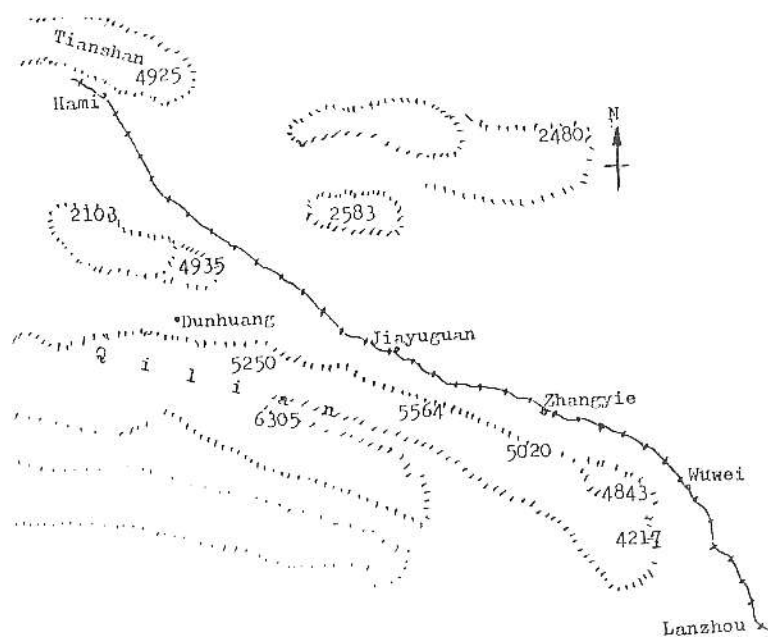


FIGURE 1. SKETCH OF THE "RIVER WEST CORRIDOR", CHINA, ON THE ANCIENT SILK ROAD

starting at the sunrise from Hami, climb to about 7000 to 8000 m in the wave on Tianshan Mountain, then at about ten o'clock fly to Qilian Mountain and soar along its ridges to the east end then return along the same ridges back to Hami again. Such a flight would take 14-15 hours and would be enough to break the existing goal and return distance record.

Now, a new building with a big hangar and accommodations for both domestic and foreign pilots has been erected, high performance sailplanes are available and conditions of communication and transportation are improving. Pilots of all countries are welcomed for soaring and record breaking.

We think that in a developing country, where few people can afford to soar for leisure, it is important to develop the gliding/soaring "market" in those existing professional pilots who are interested in finding an alternate cheaper way to log more flight time and get practice in meteorology, visual navigation, emergency landings, etc. this is true even in a developed country such as the U.K. according to their annual statistics about 16% of the glider pilots are from service clubs. Captain George Lee was in the services while he won the World Championship three times. We made a statistic: the total distance and time flown by the sailplanes in the Friendship Gliding Competition between China and France in 1983 were 9,387 km and about 150 hr. respectively, consuming about 810 kg of fuel by the tow plane in about 18 hours. The same amount of fuel would only be enough for a jet fighter to fly for 1.5 hours. Why not use the inexhaustible energy in the atmosphere.

Competitions for these pilots form a good means to develop their flying skills. In addition, competition or record breaking promotes the development in science, technology, economy and culture. FAI was formed only 3 years after the invention of the airplane in 1903, and has helped promote the tremendous development of aviation by competition and setting records to encourage people to fly longer, higher, faster and farther. There are many examples — for instance, the technology of engines developed through air racing, the famous Spitfire was powered by the Merlin engine, developed from the originally used Supermarine, the champion of a seaplane

race. All such examples lead to the fact competition promotes development!

6. SUGGESTIONS

In conclusion, for more effective promotion to gliding, may we comment on the following points, for the consideration of IGC and OSTIV, that is:

- Try to get an internationally recognized concept and official regulations stating that flight time in gliders or sailplanes, in a certain manner, can be counted in the total flight time required for licensing (either initial application or renewal) of airplane pilots.
- Take "competition promotes development" as a motto of FAI and design competitions and their rules with this spirit in mind. The recent excellent attempt to set simpler and more suitable events for boys and girls in the First world Air Games will surely promote early flight education (or early aerospace education).
- Try our best to make gliding accepted as one of the events in the Olympic Games. This can help promotion still more. Maybe changing some rules or designing simpler events would help gliding to be welcomed by the ruling body.
- Spectacular demonstrations (e.g. glider acrobatics, formation, flying, etc.)
- Promote the sport among young people (e.g. setting a new class for boys and girls, precision landing, much less expensive methods of competition, etc.).
- A simple competition comprising precision landing and duration with a catapulted low speed 3 axes controlled glider which can be operated within a stadium.