

PIPER AIRCRAFT CORPORATION LOCKHAVEN, PA, USA

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HISTORY

The Piper Aircraft Corporation was organized in 1930 originally as the Taylor Brothers Aircraft Corporation. The newly organized company was located in Bradford, Pennsylvania and was one of many formed in the United States at that time as the result of the wide spread interest in aviation. Manufacture was started on the "Chummy" airplane which was a \$4,000 airplane with a 100 h. p. engine. Production had hardly started when the depression hit and aircraft market was all but wiped out, particular expensive airplane such as the "Chummy."

In 1931 the company went bankrupt, but was reorganized as the Taylorcraft Company, with the idea of producing a small airplane which could be sold and flown more economically than existing airplanes. The ship was designed mainly for the flying school operator who at that time had t use high-powered, expensive to operate airplanes , most were powered with war surplus OX-5engines. The outgrowth of this idea, which was sponsored by W. T. Piper, a local oil man who had become interested in the company, was known as the "Cub". The ship was a two passenger open monoplane with a 37 h. p. engine. While it was a slow, uncomfortable and sluggish in performance, it was the dawn of a new era in aviation, - the light airplane. Reaction to the Cub was not very enthusiastic at first. Operators scorned the ship for its low power and glider type performance. However, flying schools came to the realization that, if they were going stay in business, they'd get more economical equipment. Operators who were using the Cub were making money, and others fell in line.

The first "Cub" was test flown on September 10, 1931, and derived its name because the first engine used was a "Kitten" manufactured by the Light Foundry Company of Pottstown, Penna. The word "Cub" seemed to correspond with the engine's name and has stuck ever since until now "Cub" is practically a common noun used to describe a light airplane.

Production on the Cub (Model E-2, Continental 4 cylinder 37 h. p. engine) started immediately in 1931 and the following production figures indicate slow acceptance of the light airplane for the first few years:

1931	20	Cubs
1932	21	Cubs
1933	16	Cubs
1934	70	Cubs

By 1935 the Cub's fame had spread and its beneficial efforts on profitable flying school operations became more and more accepted. Through 1935, the Cub remained the same as it's original design with only a few minor improvements. A cockpit enclosure had been developed to make the

plane more comfortable for cold weather operations. The few years the ship had been in operation, however, indicated some changes were necessary. The ship was ugly had angler lines, square wing tips, tail surfaces, and a narrow landing gear. Embodying these necessary improvements, the Model J-2 Cub was introduced in 1936 and with wider landing gears, improved lines, it was extremely popular. 541 of these ships were manufactured in 1936, and unprecedented production record.

During these years, the company was manufacturing planes in a hanger at the Bradford, Airport. At first all of the work was done in one building, from welding to final assembly. As demand for more production increased additions were added to the original building in the form of long "L's" were doping, covering, and welding were conducted. By the middle of 1936, the floor area of the Cub factory was 36,000 square feet, and in the summer production was stepped up to 12 airplanes per week, and unheard of record.

In March, 1937, the Cub factory was completely gutted by fire which originated in the dope room.

Despite nearly 100% damage, jigs and tools were immediately salvaged and within a week after the fire a cub had been built, the various departments working in garages, empty buildings throughout the city of Bradford. In the meantime, Mr. Piper was busy scouting for a new and more accessible location for the new Cub factory. With the site chosen as Lockhaven, Pennsylvania, the works were moved there on July 4, 1937. The new plant was a large concrete, two story former silk of of modern design, ideally adapted to aircraft manufacture. Its floor space of 100,000 square feet was more than ample for current production needs. The plant and its 16 acres of adjoining ground space was located next to the airport. The Susquehanna River which flows through Lockhaven, afforded excellent facilities for seaplane flying. Despite slowing of production caused by the fire and moving, 687 J-2's were built in 1937. In November of 1937, the name of the company was changed to Piper Aircraft Corporation, Mr. W. T. Piper having bought up the interests of C. G. Taylor, in 1936.

The acquisition of the new plant laid the ground work for revolutionary methods of plane production. Many of the present straight line production methods used in military plane manufacture saw their first use in the Cub factory. In setting up and purchasing new machinery for making Cubs, a highly reputable industrial engineering concern was retained to assure most efficient constant flow of production methods. At first the entire manufacturing operations were done on the first floor of the building, but soon it was necessary to expand several departments to the second floor, and eastern half of the entire building was devoted to final assembly.

Among the most outstanding developments which speed construction was the "Ferris Wheel" in the dope room. Similar in many ways to the regular circus wheel, the device has a capacity of twelve wings and six fuselages. As they rotate, workmen spray the units dope (special aircraft paint); by the time that unit comes around again, it was dried and is ready for a second painting.

Shortly after the Ferris Wheel was introduced, a conveyor system was installed which stepped up production some 10%. It consists of an overheard monorail system which connects, with switches, crossovers, and sidings, all departments. The minute a fuselage or wing leaves its jig, it is put on the monorail system and passes at a steady pace through all stages of installation and painting direct to final assembly. Currently there is more than a mile of this railroad system in the plant. The Piper Plant was the first to introduce this method of construction.

In 1938, an improved version of the Cub was brought out and known as the J-3 with the 40 h. p. engine. It was named the Cub Trainer and a deluxe model was introduced, known as the Cub Sport. 736

Cubs were built that year which the introduction of many of the innovations mention in in the previous paragraph. During the summer of 1938, experiments were conducted on the new 50 horse [power which were introduced by Lycoming, and Franklin as well as Continental. With this additional horsepower the light plane really came into its own.. Improved take-off faster speed, better load carrying capacity made the airplane more useful particular for the private pilot, to whom sales were steadily increasing. At the same time, development was started on a new Cub which was to be side-by-side, larger and faster than the Trainer model and intended mainly for the private owner. History was made when the price of the 40 H. P. Trainer was lowered to \$995, first airplane to sell for less than \$1,000.

This new model, known as the Piper Coupe (J-4) was first introduced at the 1938 Natonal Air Races, with production starting in 1939. The ship was a new conception of luxury in light airplanes. Complete with hydraulic brakes lights, compass, and large gas tanks, the ship pointed to greater increased private owner sales. It was powered by a 50 h. p. engine originally, but in the spring was approved for 65 h. p. which gave it excellent performance.

In the meantime, the Government's Civilian Pilot Training program which had passed through the experimental stage, gave a new spurt to light plane traveling. The Cub Trainer became practically the universal ship for this purpose and over 75% of the planes used in the C.P.T.P. Were Piper planes. 1,376 Trainers were sold in 1939 in addition to Coupes bringing the Cub total for that year to 1,806, a figure never before equaled by any manufacturer, This represents over half of all non-military airplanes in the United States and 60% of all light airplanes.

In 1940, additional improvements in design were effected. The Coupe was completely restyled by a Detroit industrial designer and a muffler was added which reduce engine noise to a comfortable minimum. Speed and range of the Coupe was stepped up considerably. The Trainer was approved with 65 h. p. and became instantly one of the most outstanding airplanes for performance. Early in 1940, another new Piper plane was announced, - the Piper Cruiser (J-5). Designed to meet the needs of the airport operator for a three passenger ship, low in cost and operation, the Cruiser, which sold for less than \$2,000 was the answer. With the pilot up front and two passengers behind, the ship had a 75 h. p. engine, duel controls, and hydraulic brakes. It was an instant success.

With increasing demand for the Coupe and Trainer, and a new demand for the Cruiser, existing plant space was not enough to meet the demand. A continuous backlog of 400 to 500 planes made new additions necessary. In June of 1940, two new assembly buildings were started each 400 feet long by 50 feet wide. Completion of the buildings made it possible to have 50 to 60 airplanes in the final assembly stage at all times and a higher specialization of labor, thus simplifying the work of any individual or groups.

1940 production again broke all existing world records with 3,016 airplanes built. This figure represented 46% of all non military airplanes, and 59.6% of all airplanes under 100 h. p. It was the sixth straight year that Piper planes exceeded the entire production of the rest of the light plane industry.

So far in 1941, production has exceeded the phenomenal 1940 figure and other improvements have been noted. Further construction will, when completed, raise the total factory floor space to more than 250,000, square feet. The new buildings include a shipping and crating building with an indoor railroad siding, a new modern dope building, and a warehouse. In the spring of 1941, a new two story office building was completed housing Sales , Accounting and engineering Departments. In June 1940

the 1,200 employees became unionized under the A. F. of L. Employee relations center around the Cub Fliers, an organization of workers interested in learning to fly. Organized in 1935, the Cub Fliers has grown to the point where more than 300 active pilot-members. It has currently seven airplanes, supplied by the company, and three instructors.

Most outstanding development in 1941 was the final acceptance by the U. S. Army of the light plane as an important factor in modern warfare. After three months testing in maneuvers, the Cub Trainer was found excellent for carrying messages and officers behind the lines, and directing artillery with two-way radio. Nicknamed "Grass Hopper" and officially designated the O-59, military versions of the Cub Trainer have been delivered in quantity to the Army Air Force. The year has also seen a tremendous increase in export business, particular to South America, where many countries are instituting programs similar to the United States Civilian Pilot Training Program, (U. S. C. P. T. P.) and choosing Cubs for the training work. Planes delivered, or on order to South America will exceed more than 350 in 1941.

CONSTRUCTION & RAW MATERIALS

The Piper plane is manufactured according to orthodox aircraft method. Fuselages are made of special aircraft steel tubing welded in heavy jigs into a bridge like construction. Carbon and chrome molybdenum seamless tubing are used in this process. The most advanced welding systems are used at the Piper plant and its welding department is considered the largest in the world. The fuselage is covered with fabric and treated with special aircraft dope which strengthens the fabric to the point where it is as strong as metal and less subject to damage.

The wings are made of two main spruce spars to which they are attached Nicral riveted ribs and chrome molybdenum compression ribs. The entire structure is covered with fabric and treated the same as the fuselages. Each wing rib weighs less than 8 ounces, but will withstand test loads of more than 800 lbs. Each.

Tail surfaces, landing gears, and other smaller components are made of welded steel tubing fabric covered. Cowlings, inspection covers, etc., are of aluminum but there is an increasing trend toward stainless steel which can be quickly and cheaply fabricated through the electric shot welded process.

Most materials received at the Piper plant arrived in freight car lots although many of the small shipments arrive by motor truck. Parts used to make the Cub come from all sections of the world. Special aircraft quality spruce comes from the Pacific Northwest, steel tubing from Pittsburgh and stuffing for the cushion from over seas.

Few manufacturing processes are so thoroughly regulated and guarded as the making of airplanes. Every airplane must be made according to rigid safety regulations prescribed by the Civil Aeronautics Administration, and even before production can started, the basic design of the airplane is thoroughly tested from the standpoint of safe flight characteristics and construction methods. In addition to the staff of 50 factory inspectors, a staff of government resident inspectors is at the Piper plant at all times, helping to see that all planes leave the assembly line in air worthy condition.

METHOD OF DELIVERY

Unlike most manufactured goods, Cubs are seldom shipped. About 85% of the planes manufactured

are flown to their destination either by their owners or by a factory ferry pilot. In 1941, the factory delivery system was introduced to the advantage of purchasers and employees alike. Dealers, busy with flight instruction have been finding it increasing difficult to spare good pilots to go to the factory for planes. At the same time, there many good pilots working at the Piper plant anxious to make extended cross country flights. Under the factory delivery system, guaranteed delivery of the planes is made by members of the Cub Fliers who are paid a certain mileage rate which assures them of complete expenses. Three cents per mile is allocated for insurance on the planes.

Cubs have been flown to delivery points in many places beyond the borders of the United States. A number of Cubs have been flown to Alaska, nearly a dozen Cubs have been flown to Panama. Others have been flown to Puerto Rico, Cuba, And other Caribbean Counties.

Deliveries made to the west coast are usually made by freight cars, however, since six dissembled ships can be loaded in one car effecting considerable savings in delivery expense. Foreign shipments to South America, Africa, etc., are by steamer and the planes are completely crated in a compact box. Cubs have been shipped to more than 60 different countries and before the war Cubs were built at the Cub Aircraft Corporation plant at Copenhagen, Denmark, for distribution throughout Europe.

SALES POLICY AND SUCCESS

The fact that more Cubs have been sold than all other light planes combined is due to several very definite reasons. These can be summed up by three general classifications: 1. Superior design, 2. Active selling organization, 3. Complete line of models.

1. There are certain characteristics of the Cub, particularly the Trainer, which are unequalled in other airplanes. The main ingredient in this factor is the wing section used by the Cub. While not of high speed characteristics, the wing section has excellent stall characteristics and has no tendency to spin or stall without the most ample of warnings. The Cub has earned its justified reputation of "forgiving a student for more mistakes than any other airplane." The ships slow landing speed and coordination of control has done much to make flying simpler and easier. Despite the fact that a large portion of the nation's training, (most dangerous part of flying) is done in Cubs, the Cub's safety record is UN-excelled.

In addition to these facts, the Cub is an excellently built airplane and can withstand most severe maneuvers. Within the past few years, the nation's leading aerobatic pilots have virtually discarded their heavier and more powerful stunting equipment and adapted Cubs almost exclusively for their exhibition work.

The Cub's design has also been developed for cheap and mass production. Because of this the Cub sells for several hundreds of dollars less than similarly equipped competitive aircraft. This production angle in design also effects servicing of aircraft in the field with parts being cheap and simple to replace.

1. Along with these leading characteristics, the Cub has behind it the largest and most active sales organization in the world. The sales policy of the corporation is based along standard

practices of merchandising; a distributor-dealer set up. There are currently 51 distributors in the United States with nearly 500 dealers under them. Territories follow closely state lines, but marketing areas and natural sales territories are more and more displacing arbitrary state line delineations. All sales in any territory pass through the distributor who helps and encourages dealer sales. A very strict policy on infringements has been set up thus protecting distributor territories. It can be safely said that the Piper sales policy is one of the most clear cut in the industry, and for that reason been responsible in developing the present magnitude of the Piper organization. The aircraft industry has been notorious for its lack of respect of assigned territories or contracts which have been detrimental to the morale of the distributors and dealers. In practically every territory, the Piper distributor is the leading aircraft operator and is in every case a responsible and well established organization.

ADVERTISING

To bolster Piper sales, the factory conducts the most extensive advertising campaign of any commercial manufacturer. Currently annual advertising appropriation is \$150,000 and Piper has paved the way to general advertising in magazines such as *Saturday Evening Post, Collier's, Country Gentleman, Fortune, etc.* 1941 saw the first appearance of full page color ads. The Piper Company is active in many other types of promotions which have a direct benefit to dealers. For the past year and a half, it has been hooked up with a coast-to-coast radio broadcast in which a Piper Cub Trainer has been given away each week. During the past two years, 65,000,000 books of matches have been distributed advertising Piper Cubs. The company is aggressive in publicity promotions and because of its predominance in the field has monopolized this phase of promotion.

A newly instituted feature is the 50 – 60 page advertising program for dealers. Under this plan a dealer is given a credit to the amount of ½ of 1% of his yearly business at the factory which he may use for local newspaper advertising, radio plugs, etc. Likewise a nation wide bill board campaign has been instituted.

3. In addition to these factors, one of the most important items is the diversity of models offered to the public. While most manufacturers have had to concentrate on only one type of plane, Piper's size of factory and personel has made it possible to offer three different models which suit every need for private flying and commercial operation.

The Cub Trainer is excellent for student instruction and because of its amazing ability to get in and out of small fields suits the needs of certain types of private owners. The Coupe is an ideal private owner airplane intended entirely for that purpose. The Cruiser has opened new revenue possibilities for the operator in that it can be used both for passenger carrying and student instruction. The Cruiser also is satisfactory for private owners as it sell for one-half the next lowest priced three passenger plane.

FINANCING

The increased sales of Cubs several years ago prompted the institution of time payment plans in selling aircraft. These policies follow roughly the same plan as for automobile financing and rates are not much higher. A minimum down payment of one-third is required and the balance is usually paid in 12 months although in special cases this may be arranged for 18 months. The basic finance plan calls for charges and insurance of 10% on the unpaid balance. Recently different types of repair-and-

replacement plans have also been instituted. While much of the aircraft financing is handled through established aircraft financing companies, local banks have become increasingly interested in aircraft paper and find the risks about the same as auto loans. Around 50% of the light airplanes sold are financed.

USES OF CUBS

It would be almost impossible to list the uses to which Cubs are put. Primarily, however, Cubs are used for instruction work and pleasure flying. Within the past year or so, they have been put to many other uses as well. These include among other things:

- Crop Dusting
- Forest fire patrol work
- Mail carrying
- Transportation for salesman and businessmen
- Coyote and wolf hunting
- Crop survey work
- Border patrol flight
- Cargo carrying
- Running trap lines in Alaska
- Pipe line patrol
- Banner towing
- Police work
- News photography
- Commuting
- Rescue work and supply after disaster.