Aircraft Costs Held Far Below General Price Rise

The need for building planes for the greater performance they give in the supersonic and sonic speed ranges.

New studies made by aircraft companies reveal, however, that the cost of an airplane per pound is only slightly more than it was in 1940.

One typical fighter plane manufacturer built a fighter in 1949 at a cost of $15.16 per pound, or less than 20 percent more than prewar despite the fact that costs and prices generally are 100 percent more than prewar. This is typical of the entire industry.

Titanium Tested For Aircraft Use

A new metal titanium, stronger and lighter than present aluminum-alloy alloys, has aircraft designers eying new horizons of plane performance. Test results of recently-announced tests show that this new metal is far superior in corrosion-resistant properties to any known metal. After 120 days’ exposure to salt spray, the new metal showed no deterioration while other metal rusted and staved. Corrosion is an old bugaboo of plane metals.

Although it is difficult to produce at present, one of the most important features of the new metal is that its basic “ore” is superabundant in the United States. The National Aeronautics and Space Committee already is drawing up a specification for the use of this metal in military aircraft.

Machine “Sculptures” Wing Skins

Hypro planer type mill shown cutting away unnecessary material in wing areas where it is not required for structural strength.

Aircraft Speed Boosted By Wing “Sculpturing”

One of the newest production processes required by the vastly increased aircraft performance of the sonic speed era is a method of “sculpturing” metal wing surfaces to pass precious pounds from an airframe. It is done with a hypro planer mill, a huge machine developed by a plane manufacturer specifically to meet the extremely high accuracy requirements of a late model fighter.

Although the hypro planer looks like a machine shop garnish, its output is comparable in accuracy to that of a jeweler’s lathe. The milling of a wing skin, in fact, requires the same kind of precision craftsmanship as jewel cutting. But so exacting are the demands for precision on new high speed planes that such jobs as skin milling cannot be trusted to hand methods.

Electronic Control

Electronically-synchronized motors control the hypro planer’s two cutting heads, as well as the rate at which the metal sheet is fed through the cutting heads. The sheet being milled is held securely in place by means of a rubber suction chamber. If it has to be lifted from one operation to another, motor-driven vacuum cups are lowered against it and then hoisted. Out comes a sur-

Soil-saving Planes

One of the most recent answers to soil restoration seems to be in the proper application of the highly potent hormone type chemical. Without the airplane and the new chemicals it would take us over 200 years to solve this problem but now it appears possible and logical to settle it in a period of five years.

Another development is a pelleted seed which has been sown by airplane on several hundred thousand acres in the past three years. These pellets are made of suitable soil and contain the right number of seeds. In each pellet is a fertilizer element, and insect, bird, and rodent repellents. The pellets weigh enough to stay where they fall and the seeds within them will germinate with only a little moisture.

Aerial Seeding

In the rich and fertile coastal plains of Texas and Louisiana, far-sighted young men in both agriculture and aviation have used the airplane as an instrument in planting, fertilizing, and weed control of their crops. In 1949 acres of rice. On the West Coast approximately 80 percent of their entire rice crop is planted, fertilized and weeded by plane.

Other services the airplane is performing on the farm today include polinization, crop defoliation, forest patrol, pruning fences, checking cattle, aerial photography, and mapping. During the last winter the airplane gained many friends as a means of emergency distribution of the need for building planes for the greater performance they give in the supersonic and sonic speed ranges.

Leading Senator Says Plane Will Solve Farm Ills

“A mighty influence”

Written for Planes

By Senator Elmer Thomas, [D., Okla.] Chairman, Agriculture Committee, Ranking Member Appropriations Committee, U. S. Senate

Among the most serious problems facing our government today are those related to soil conservation and restoration. The airplane as a new farm implement will exert a mighty influence in the solution of these problems. Realizing this, the American farmer has welcomed the airplane as necessary to his operations.

Let each of us consider the picture familiar to our minds of the non-productive farm lands in our respective states. In my state of Oklahoma we are unfortunate in having over 100,000,000 acres of agricultural lands rendered non-productive by the invasion of useless weeds. This growth is a result of the disturbances of the balance of nature. Something must be done to solve this problem.

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Air Program Falling Behind

The United States is slipping behind schedule in several vital respects in meeting the 1952 deadline for the existence of an atomic age defense force in being, as recommended by the Congressional Aviation Policy Board and the President’s Air Policy Commission in 1948.

We perhaps are inclined to overlook the implications beyond the reports of these two boards. They are not those of interested parties in any phase of aviation, but of two groups constituted to examine the nation’s requirements in the air, and to report to the executive and legislative branches their findings. They arrived at significantly similar conclusions, reached by different methods. In each case, they were unanimous.

Serving on the Presidential Board were Thomas K. Finletter, distinguished New York attorney, as chairman; George P. Baker, professor at Harvard University, as vice chairman; Palmer Hoyt, publisher of the Denver Post; John A. McCone, West Coast industrialist; and Arthur D. Whiteside, president of Dun and Bradstreet.

Members of the Congressional Aviation Policy Board were Senator Owen Brewster, chairman; Representative Carl Hinshaw, vice chairman; and Senators Albert W. Hawkes, Homer E. Capehart, Edwin C. Johnson, and Ernest W. McFarland; and Representatives Charles A. Wolverton, Karl Stefan, Alfred L. Bulwinkle, and Paul J. Kilday.

These groups established the 1952 date, and in view of the caliber of the membership their recommendations merit complete public support. Some phases of their recommendations were authorized in 1948, others have as yet had no final action.

A year ago Congress voted funds to start modernizing the Air Force and Naval Aviation. The 70-group Air Force with a proposed long-term aircraft procurement program was the basis for the modernization. However, despite this, legislation authorizing the composition of a 70-group Air Force has not been completed. There is as yet no statutory long-term program of aircraft procurement upon which the health and stability of the aircraft industry and economical purchasing for the taxpayer depend. Other recommendations which would tend to make for more sound and economical aircraft procurement have had no action. These are elimination of overlapping and duplicating provisions of the Vinson-Trammell Act and the Renegotiation Act of 1948, and a peace-time contract settlement act similar to that used in wartime to provide efficient, equitable and prompt termination procedures.

Stepped-up plane production, another recommendation of the two groups, has come along fairly well since the reports were issued, but today it is still under the minimum recommended. Both groups asked gradual buildup to between 60 and 63 million pounds airframe output annually by 1952, based on the fact that by then all war surplus planes would be used up and all replacements thenceforth would come from new production. Actually, all war surplus planes and engines will be exhausted before 1952.

Both groups recommended a succession of five-year programs for research, development and procurement of planes. Evidence given these boards showed that the ordering of planes in quantity under such programs will enable a savings of 20% to the taxpayer.

The deadline set for attaining air supremacy was based on the considered judgment of the nation’s leading authorities that by 1952 America must have, in being, air defense power to meet any sudden atomic attack.

Nothing has happened in the past year to change that belief.


Airlift Proves Large Planes Easy On Gas

Fuel supply problem of the Berlin Airlift, involving at Rhein-Main station alone twice the daily deliveries of huge La Guardia Field, New York, points up the value of larger military transport planes.

Fuel consumption at Rhein-Main, Germany, ran to 170,000 gallons daily, six times pre-Airlift volume. "Vittles" on their way back show that hauling all tonnage in pre-war two-engined transports would consume 14,500,000 gallons a month. The four-engined wartime model used on the "Lift" could do the job with 8,577,000 gallons per month. But a large, new, post-war, four-engined model could handle the tonnage requirements for 6,000,000 gallons.

Four-engined Zoos

Two recent charter flights of international airlines reveal how air-minded the world’s zoos have become. About 500 furry passengers, who couldn’t otherwise have been transported in captivity, were delivered to the New York and Cairo, Egypt, zoos.

New tenants for the two zoos, flown from Singapore and the Belgian Congo, included 350 fowl, four bears, four orangutans, monkeys, civets, giant lizards, okapis, gibbons, and one langoor.

The okapi, somewhat of a cross between a giraffe and an antelope, was flown on the ordinary airline fare, preferring sweet potato leaves.
**Spirit Runs High As Schools Try Air Program**

Competitive spirit is running high among the state school systems of America this year, each striving to outstrip the other in curricula to the "air age." More than a hundred accredited aviation education courses are being given this summer at teacher training institutions in the United States. During the coming months thousands of teachers will get their first ride in an airplane as hundreds of local school systems, with the help of airlines and airport operators, conduct "airport institutes" for teachers.

**Essay Contests**

If a vote were taken on leadership in this field, from the standpoint of effective promotion of their programs two states, Idaho and Missouri, would stand high in any balloting. Both states have offered overseas vacation trips as prizes for new thinking in the field.

Missouri is giving the writer of the most significant essay on "Why Consider Aviation in the Education of Today's Child" a six-day, all-expense trip to Havana, Cuba. Last year the winner of a similar contest a year ago, Mrs. W. H. Brooks, received a five-day all-expense aerial tour of the North Western United States, and five scholarships for summer professional study. Today the state department of aeronautics has offered a vacation in Hawaii to a young woman teacher in a Boise junior high school. This year the state department of education in Idaho sent the winner of a similar contest a week in New York and Washington, D.C.

Missouri and Idaho ran a contest last year on the subject "How Can the Schools Accomplish Air Age Education?" and 127 teachers entered. The winner of a vacation in Hawaii was a young woman teacher in a Boise junior high school. This year the state department of aeronautics has offered a contest on "Applied Air-Age Education in Idaho Schools." Teachers have been asked to write success stories on how they have applied air-age education concepts and materials in the classroom. In addition to the Hawaiian trip, prizes this year include five-day all-expense tours of the North Western United States, and five scholarships for summer professional study. The state department of aeronautics has invited the winners to attend its annual convention in Las Vegas in June.

**NEA Recognition**

This movement to "condition" the teachers and schools of the nation in the social meanings of aviation has been going on for many years. Pennsylvania, for example, claims to have pioneered a high school aviation course twenty-one years ago. Until the early 1940's, however, when World War II demanded a new appreciation of the airplane, only a scattering of the nation's school systems took it seriously. Today the state department of aeronautics recognizes that it is a movement that has well-defined aviation education programs, reaching from elementary grades through college levels and focused particularly on teacher training.

**A good deal of the inspiration and impetus in recent years, school officials seem happy to admit, has come from the nine-man staff of the education division in the U.S. Civil Aeronautics Administration. For years school officials have been working with school officials and helping them organize aviation education programs.**

Evidence that the movement has made permanent headway is contained in the announcement recently made by the National Education Association, national parent body of local school groups, that it is considering adding as one of its operating divisions a council on aviation education.

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**Airline Classroom**

Airline fares reflect lower cost operations despite inflation

- **75 PER CENT RISE IN AIRLINE FARES SINCE 1941, COMPARED WITH COACH, PULLMAN AND GENERAL COST OF LIVING**

- **60+ %**

- **50**

- **28%**

- **31%**

- **13%**

**SOURCE: AIR TRANSPORT ASSOCIATION OF AMERICA, INC.**

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**Putt-putt Golf Course**

An airport surrounded by a golf course is Earl Tollison's answer to making a small port pay off as a recreation center. Tollison, Walden, N. Y., airport operator, is well along in constructing a nine-hole course completely around the borders of his landing field. By next summer he expects to have added a clubhouse, outdoor pool and restaurant.

**NAVY AIR STRENGTH WORLD WAR II PRESIDENT'S BUDGET RECOMMENDED FOR SECURITY**

- **37,893 PLANES**

- **5,598 PLANES**

**RECOMMENDED FOR SECURITY**

- **10,893 PLANES**

Minimum 1st-line operating and support, recommended by President's Air Policy Commission.

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**Planes Quiz**

Seventy per cent score on this quiz is excellent. Sixty per cent is good. Answers on page four.

1. True. False. U.S. researchers are working on rockets to climb more than 3,000,000 feet over the earth.
2. Air transportation was selected by (a) 15 per cent; (b) 48 per cent; (c) 37 per cent of all people issued U.S. passports in the year ended March 31, 1949.
3. There are (a) about 56,000; (b) nearly 90,000; (c) 45,000 personal type aircraft registered with the U.S. Civil Aeronautics Administration.
4. A year and a half after the recommendation of the President's Air Policy Commission, the 70 Group Air Force program now is an actuality.
5. Latest actual figures published by Russia's embassy in the U.S. show 58,127 U.S. air route miles, although the route maps of the world, in contrast, certify U.S. overseas and domestic airlines in 12 months ending Dec., 1948 were operating (a) 212,000; (b) 31,000,000; (c) 184,133 route miles.
6. The U.S. Air Force can fly its long-range inter-continental bombers—loaded from more than 40 air bases in the U.S. at end-of-war weight, they could land at (a) more than 300; (b) nearly 150; (c) 204 air bases in the U.S.
7. Electrical system in one of the clearest World War II fighters contained 515 separate wires. A new jet made by the same company has (a) 983; (b) 1077; (c) 1880 separate wires.
8. In 10 years, 1939-1948, the number of U.S. scheduled airline stops has increased (a) 162 per cent; (b) 33 per cent; (c) 93 per cent.
9. True False. The normal rate of descent for a combat parachute is 17 feet per second.
10. Twenty-five years ago Army planes circled the world in 14 days and 15 hours. Recently the lucky Lady II circled the globe—24,592 miles non-stop—in (a) four hours, 13 minutes; (b) three days, 22 hours; (c) four days, 13 hours.
How aircraft profits compare with the rest of industry

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SOURCE: NATIONAL CITY BANK OF NEW YORK

SCULPTURING

(Continued from page one)

Face that is contoured to the varying strength requirements along the wing.

The sculptured surface is the most recent development in a long struggle for a more efficient wing structure, an effort that can be traced back nearly 30 years to the introduction of the taper-wing. Although tapering saved some weight, until the advent of the sculptured surface, the wing skin was uniform in thickness and weight from fuselage to tip. Since forces in flight play heaviest on the end of the wing, the tip doesn't have to be as strong as the root, so this milling process boosts planes, however, thin sections can be machined.

Close Tolerances

For current production purposes the manufacturer who developed this process works with sheets of aluminum alloy ranging in thickness from 5/32-inch to 1/3-inch. The Hygro planer contouring makes it possible to taper such sheets from 3/16-inch at the fuselage fitting to as little as 1/32-inch at the tip. The milling machine requires tolerance as high as a couple thousandths of an inch; however, even thinner sections can be machined.

As explained by the company which pioneered this new departure in wing construction, "skins are not just a simple taper, but are sculptured to meet the exacting requirements of the particular section of the wing."

The huge hygro planer was developed for a specific plane model, one that gained the American market's acceptance, the Wichita. This new milling technique by its very exactitude adds to the cost of producing limited quantities.

COSTS

(Continued from page one)

A transport buyer would obtain the capacity to carry 18,400 pounds 200 miles in an hour, or two-and-one-half times the 1939 performance value.

The answer to ability to attain economies of this kind lies in the great increase in efficiency, in the new manufacturing techniques and in more efficient plants, labor and tooling. The country is purchasing planes in all types—fighting, bombers and transports—of at least twice the speed, twice the altitude and at least one-third more range. The fighter goes 600 miles an hour as compared with 300. It operates at 40,000 feet instead of 20,000. Its range is 1500 miles instead of 900. The transport of 1939 had a useful load of 8,800 pounds and a speed of 193 miles an hour, as compared with 40,000 pound useful load and a speed of 300 miles per hour for the 1949 version.

Difficult Processes

Some of the factors, such as the standardization program, which number of various types of many items has been reduced to a bare minimum) are industry-wide. As an example, where a谓LEC design might have required 100 different types of screws in a single airplane, standardization has reduced the number to only 10.

The industry has produced innovations in other directions. Planes today are designed from the airplane for mass production, eliminating a step that before World War II was standard practice. This may add to the cost of a first plane, but it saves millions of dollars in later stages of the development of a particular type. Advances in the technology of manufacturing have made this possible.

Design Revolution

Weight and costs can be saved with plastics. The aircraft industry has been a pioneer in the development of special plastics and in the study of their uses. Moulded tooling is a roughly similar development in which the aviation industry has led. Another example is found in this issue in "sculptured" surfaces.

The aircraft industry has been the nursery of a virtual revolution in design during the past 10 years. Despite this revolution, the industry has striven to hold costs in line, and despite the influence of general inflation, higher labor costs and the shock of demobilization following World War II, has managed to give the American taxpayer more than has ever been possible before.

Facts and Figures

Seven out of 10 people visiting Bermuda in 1948 traveled by airline.

A new transport plane now in operation by the Air Force will carry up to 267 tons of cargo at 300 mph.

Ninety-three of 100 life insurance companies surveyed this year will cover pilots and crews on scheduled airlines.

A new pilots organization has been formed, the Indiana Flying Lawyers, Inc.

Civil Air Patrol aims to enroll 100,000 members in a pre-flight program in U.S. high schools this fall.

During 1948 the scheduled airlines cut weather delays 50 per cent.

Rain or dew gathering on the body of a new large transport raises its weight 200 to 300 pounds.

One manufacturer reports that in 10 years he increased engine efficiency 100 h.p. per year. His latest engine, however, outstripped its immediate predecessor by 500 h.p.

In testing a new propeller blade, as many as 10,000,000 vibrations a day are imposed upon it.

Development of a current model night fighter costs three times as much as a 1942 model night fighter produced by the same company.

Design, development and construction of the B-29 took three times longer than the design and construction of the Empire State Building.

Air traffic transactions handled by the International Air Transport association's London Clearing House during first quarter, 1949, reached $46,370,000, almost double last year's first quarter total.

Answer to Planes Quiz

1. True. This would be an altitude of more than 600 miles, whereas present record is about 200 miles, near the limit of the atmosphere.
2. [b]
3. [c]
5. [c]
6. [a]
7. [c]
8. [a]
9. [a]
10. [b]