

PLANES

ALL MATERIAL
MAY BE
REPRODUCED

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VOL. III

NO. 2

A National Air Policy is Essential

(Written especially for PLANES by Senator Owen Brewster, Chairman, Aviation Subcommittee, Committee on Interstate and Foreign Commerce, and Chairman, Committee Investigating the National Defense Program)

By Senator Owen Brewster

Congressional air safety investigations have done more than merely reveal shortcomings in our present air traffic system—they indicate the need for an overhauling of United States Air Policy.

With regard to safety, the story seems all too clear. We came out of the war a nation of air enthusiasts. Accordingly, last year we inundated airlines with 13,300,000 men, women and children passengers, when they were probably equipped to handle two-thirds of that volume.

A Traffic Jam

The bogging down came at the airports and on the airways. Ready for 400 planes flying 175 miles per they could not cope with 800 flying 240 and 270 miles per We've had a traffic jam.

947, at least 20,000,000 will to the airlines. We now know what is required to handle this multitude. Improvements are needed at 166 airports. We need better lighting, and radar and radio landing aids at air terminals. In addition, the present system of 4-course radio range stations, the lighthouses of the airways, must be converted to send out signals in all directions. Such installations the Civil Aeronautics Administration estimates would cost approximately 54 million dollars.

In 1948, airliners will be traveling 300 and 340 miles per hour. Think of the complications when planes approach an airport at 180, 240, 275, 300 and 340 miles per hour respectively!

No Piecemeal Job

How can we make certain that the bogging down is not repeated?

Testimony before our Senate Subcommittee shows that we are 18 months to two years behind the British in jet propulsion. A popular magazine article asserts we are behind Soviet Russia in rockets.

There has been no comprehensive study or audit of our air power since 1925. We cannot afford to risk a piecemeal overhauling of air policy, since Air Power is no longer than its weakest com-

efficient air transportation system, a healthy manufacturing industry, and adequate research and development are just as essential to air power as the basic striking air force.

More Air Travel Records

Need convincing about the reliability of air travel? If so, then read these heretofore unpublished facts about the remarkable performance turned in by our scheduled airlines during 1946.

There were six fatal passenger accidents last year. That's six bad landings among millions of takeoffs and landings. Proof? During 1946 the government operated control towers on only 117 of the 5,000 airports in the U. S. Records show these 117 airports handled 6,424,720 landings and takeoffs last year.

Do airliners come through in all kinds of weather? In all the U. S. during 1946 there were four "weather" accidents which caused passenger fatalities. During the month of October, at Washington National Airport, skilled radio controllers guided 341 planes through bad weather to routine landings. In the last three months of 1946—a bad weather period—Washington National Airport handled 42,500 operations of all types and only 478 came in on instruments. And that's just one airport.

The airlines carried 13,300,000 passengers last year, nearly double their previous year, and were giving scheduled service to 175 more cities than in 1945. Their safety record, nevertheless, was the best in history.

U. S. airlines completed 95.8 per cent of scheduled 1946 flights.

Safety is No. 1 Aim of U. S. Plane Makers

Safety is the primary consideration of aircraft manufacturers in the design and construction of commercial airliners, members of the House and Senate Committees seeking means of further improving the excellent operating record of America's airlines, were told recently by the Aircraft Industries Association.

Industry spokesmen cited the many new items of aviation equipment that make America's planes the world's safest. These included tricycle landing gears; thermal anti-icing of wings, empennage, propeller and windshield; fire prevention, detection and extinguishing equipment; reversible pitch propellers; automatic flight control equipment; pressurized cabins; and equipment now coming into use to simplify control systems.

The committees were told that engineering staffs of most companies now stand at or near record levels despite a 90 percent cut-back in overall employment from war peaks. They also heard how safety features make up 24% of the payload on a new transport.

AIRPORTS ARE OVERCROWDED . . .

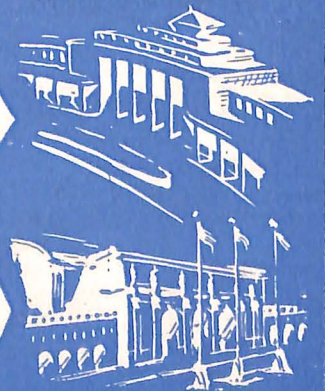
Traffic at Capital's air terminal tops R. R. movements at Union Station

180,000 PLANES IN 1946



SCHEDULED AIRLINES 105,000 MILITARY & ITINERANT 75,000

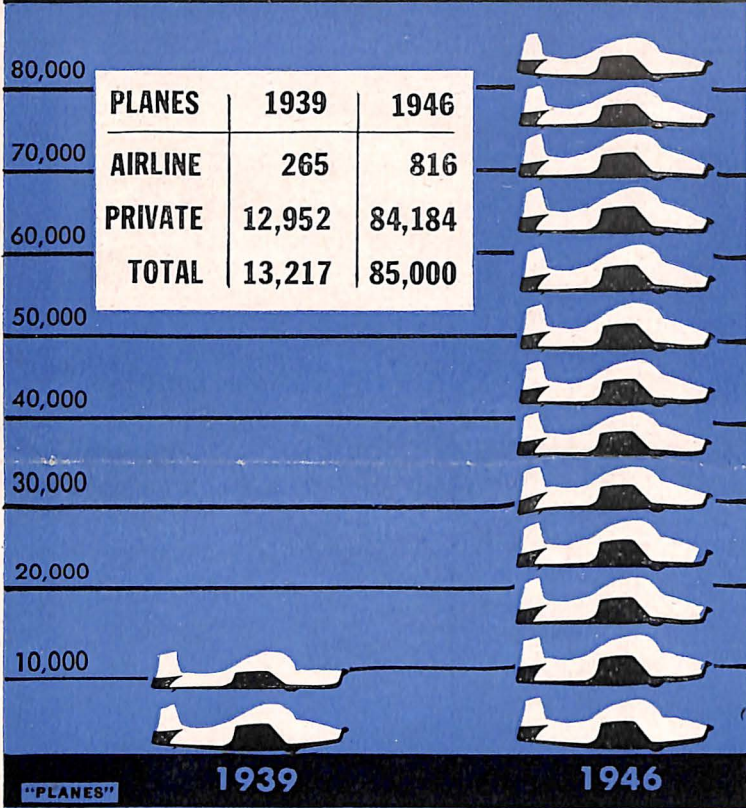
120,000 TRAINS IN 1946



WASHINGTON, D. C. ARRIVALS & DEPARTURES IN 1946 AIR AND RAIL PASSENGER TERMINALS

"PLANES"

TODAY'S PLANE OWNERSHIP 500% GREATER THAN PRE-WAR



Automatic Controls Make New Planes Easier to Fly

Trouble-free operation of today's easy-to-operate planes springs from dozens of major improvements voluntarily introduced by the manufacturers in the last few years.

Aircraft engines once required complete overhaul every 100 or 200 hours but today they can operate up to 1,000 hours without overhaul. Take bearing failures for example. They used to plague operators, now they are a rarity. Likewise, improved processing has removed cylinder heads as a source of trouble. Engines are constantly improving, as research produces better materials, better designs.

Greater Accuracy

Control of a plane once relied almost entirely on the skill of the pilot. Today many of the control functions are performed automatically and with greater precision than human skill could guarantee.

Wing flaps, introduced some years ago to improve control during landings and takeoffs, are automatically adjusted on the newest transports. Automatic pi-

lots now make long-distance, straight and level flying of huge planes almost effortlessly simple.

Propellers of multi-engine planes once were adjusted and synchronized by hand controls for each propeller. One automatic control device now keeps them revolving within one RPM of each other. The pilot doesn't have to worry—just sets it and they remain synchronized.

Valuable Protection

Is a strong air transport system vital to our national security?

The Army's air transport chief, Lieut. General Harold L. George, says "I estimate there should be available to support any possible military requirement, something in the neighborhood of 4,500 transport airplanes. The cost of such a military transport service would be prohibitive. Obviously (this reserve) must be provided by the civil airlines of this nation."

World-wide Service Offered Buyers of New Transports

Few products go to the customer under greater guarantees of service than do aircraft.

Even before a new transport plane is sold, airline engineers go over it with the manufacturer, who changes it to their satisfaction. Then, just to make sure they are satisfied, the manufacturer stations a service engineer with them.

Performance Charted

World-wide customer-service organizations are maintained, guaranteeing peak performance. Engineers at operating bases throughout the globe are required to file reports as often as once a week. All the time that transport planes are flying, logs, or records of performance, are being kept. Even such items as moving an engine from one wing to another are recorded.

Plane manufacturers are in touch with their customers throughout the world by radio, telephone and teletype at all times. If a user wants a replacement part in a hurry, he gets aerial delivery in a matter of minutes or hours, depending on how far away he is.

Seldom, however, is it necessary to fly parts to service a customer. Each airline plane is delivered with a set of replacement

parts. In addition, the manufacturers of our new, big long-range transports see to it that each of the buyer's overhaul bases is fully stocked with necessary replacements.

Thorough test runs of all vital parts enable the manufacturer to tell the customer the life expectancy of each one. A service handbook advises the plane operator when to change such parts. But for safety's sake, parts are always scheduled for replacement long before they begin to wear out.

The thorough-going service offered to buyers is a big factor in the cost of new planes and in some cases can run as high as half the sales price.

Service Schools

An idea of the attention given to customer service can be gained from the fact that one company's service engineering staff is twice the size of its research staff.

No matter how old a plane gets, or how many times it changes hands, cooperation between the government and the manufacturer assures its owner of honest service at moderate cost. If operational records ever indicate a certain part needs replacement when factory research produces an improved item, all owners are notified immediately.

PLANES QUIZ

A 70 per cent score on this quiz is excellent. Sixty per cent is good. Answers on page 4.

1. Before a new aircraft engine is offered to airline users, it receives testing runs totaling: (a) hours; (b) days; (c) years.



2. Government rules permit any transport pilot with 200 hours' experience to make a business of hauling passengers. Our scheduled airlines,

however, won't hire a beginner copilot with less than: (a) 1,000 hours; (b) 800 hours; (c) 2,500 hours.

3. True. False. A successful device has been developed for clearing fog at airports.

4. A single engine on one of our new high-speed transports contains as many as (a) 1,200; (b) 6,700; (c) 11,000 precision jewel-like parts.

5. Tricycle landing gears make transport plane landings safer because they: (a) reduce possibility of nosing over; (b) hold plane steady in strong cross winds; (c) provide pilot a better view of the runway.

6. Last year's fatality rate for U.S. scheduled airlines was the lowest in

history yet 1946 passenger traffic was up: (a) 32%; (b) 47%; (c) 84% over the preceding year.

7. While U. S. air travel increased more than 100% last year, and civil plane ownership went up 122%, the number of airports increased only: (a) 45%; (b) 72%; (c) 8%.

8. True. False. You can stay aloft in an airliner 71 days, in all kinds of weather, and not meet as much risk as taking a 500-mile auto trip.

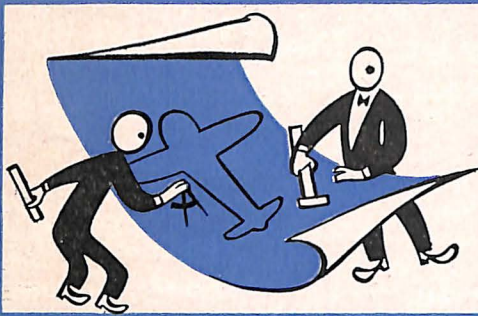
9. New reverse pitch propellers make for safer flying because they: (a) enable more precise maneuvering in the air; (b) blow ice off the wings; (c) make it possible to stop more quickly especially on wet or icy runway.



10. GCA and ILS, much-discussed in connection with air safety, are proposed government agencies for aviation; (b) new types of planes; (c) radar and radio devices by which a plane can be landed when bad weather blots out all visibility.

PROOF-TESTING A NEW PLANE

an unending search for mechanical perfection



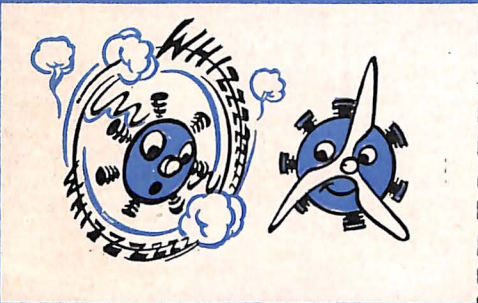
Before a test-model is built, acres of blueprints are drawn. Data are checked and rechecked and thousands of man-hours go into design analysis. Landing gear alone on one new model requires as many as 500 drawings. The blueprints for one plane can cover a four-lane highway for a distance of 20 miles.



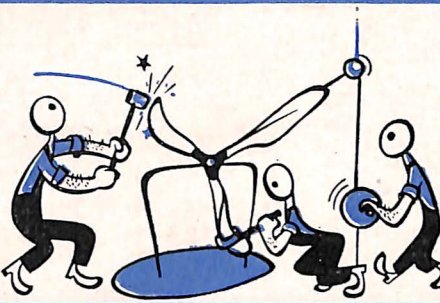
V-i-b-r-a-t-i-o-n, because of its effect on the life and strength of the materials in a plane's structure, receives careful attention of testing engineers. Both on the ground and in flight the plane is subjected to rigorous high-frequency vibration tests. Delicate instruments, especially, must give reliable performance over a wide range of vibration frequencies.



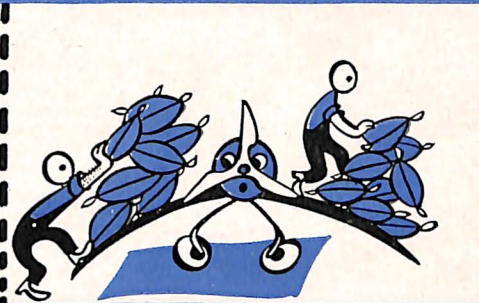
Precise skill ferrets out invisible defects in the materials and metals that go into an airplane. Materials undergo chemical and physical tests. Metals are X-rayed, subjected to sensitive light rays, or given a magnetic testing to locate and eliminate flaws. Imperfections don't escape detection, however tiny.



Gruelling test runs are given to new engines. Run repeatedly far above normal peak power, they also are pushed beyond normal limits by frequent starting and stopping. Top performance must be delivered under extremes of temperature and atmospheric pressure. Engine parts are machined to ten thousandths of an inch accuracy.



Propellers undergo tests for every manner of stress and strain. Twisted, stretched and compressed by special rigs on the ground, they also go through rigorous flying maneuvers. Special attention is given to the amount of vibration set up at various speeds. Propellers with adjustable blades, "controllable pitch props," are subjected to many sudden adjustments.



Super-strength, built into each new plane, springs from numerous and exacting strain tests, most familiar being the static load, or "sand-bag" tests. Strain in structural material is measured to 0.00001 inch per inch, and thousands of readings on horizontal and vertical movement are taken in a single wing test.



Instruments must be delicately accurate yet rugged enough to defy rough treatment. Years of research and testing go into a new instrument before it is approved. One company, making automatic pilots since 1912, recently completed three years of laboratory tests on a new model automatic pilot. Instruments undergo thousands of hours of checking, exposed to extremes of vibration, heat, cold, moisture, and dust.



Championship teamwork is required of the parts in a plane. Having reached peak perfection individually, their first real chance to click as a team comes with flight tests. Every trick play in nature's book is thrown at a new plane to prove its mettle. No part can muff an opportunity for star performance. The plane is run through every conceivable combination of natural forces and man-created hazards.



During the life of each plane and all important parts, careful performance records are kept. For example, if an engine is moved from one position to another on a multi-motored airliner, the engine maker is advised. Never satisfied, the industry is campaigning to speed the exchange of operational information between the government, operators, and manufacturers.

Last Word in Safety Aids Built Into New Transports

The ultimate in safety features is incorporated in America's new transport planes, which surpass in fine workmanship any machine ever produced by man. Many parts in a plane require finer craftsmanship than a precision watch.

As far as human ingenuity can conceive, the hazards of nature have been overcome in the design and construction of these new craft. In addition, many improvements have been made to lighten the load on the pilot.

Icing Attacked

Thermal anti-icing systems for wings, propellers, and windshields are incorporated into the newest models. They prevent the formation of ice. Earlier models relied on pulsating "de-icer" boots, which shook ice off after it had formed.

Supercharged engines and pressurized cabins have been developed to such an extent that the new planes can operate regularly far above the weather, thus avoiding local storms.

Landings Easier

Reversible pitch propellers, which can be used as auxiliary brakes, will enable these huge new planes to stop quickly when necessary. They also will reduce the hazard of slippery runways. Another feature which makes landings simpler is the tricycle landing gear. Some of the new planes also have double tires and blow-out proof tubes.

Thousands of man-hours have been expended in engineering

Every Town Can Help In Air Safety Drive

Every community in America can help in the drive for greater air safety—at cost of a couple gallons of paint.

If a plane is lost in bad weather and electrical disturbance blots out radio reception, the name of a town painted on a prominent rooftop may mean the difference between a safe landing and an accident. This year more than half a million people will be flying more than 100,000 planes over the U. S. Many of these people and planes will be guided to port by civic-minded people on the ground who have airmarked their communities.

The U. S. Civil Aeronautics Administration, Washington, D. C., will provide free plans and instructions to any civic groups interested in airmarking their towns.

automatic fire protection systems for the new planes. They are equipped with devices which detect and extinguish fires and the electrical systems have automatic cutoffs in case of emergency landings.

Greater strength and durability of valves, cylinders, pistons and rings, plus precision workmanship, make the new engines the last word in reliable performance.

Control Simpler

Powerful little motors help the pilots move the controls on these big planes, making them easier to manipulate than smaller craft. And the new models carry more radio equipment and navigation instruments than ever before, including the latest in radar installations.

After all these safety features had been added, the manufacturers still were not satisfied. To make doubly sure, they added an extra set of all the vital gadgets. They even put in two cabin pressure systems so that if one goes out, the other takes over.

New 'Helimail' Route to Open

The first regular Helimail service will be started sometime this summer in Los Angeles, Calif., after action of the Civil Aeronautics Board on an examiner's report. The report recommends mail service by helicopter from the Los Angeles airport to suburban cities up to 50 miles away.

Helimail service, now tested in Los Angeles, Chicago and New York, will put any suburban community within 12 hours' mail-time of any other similar town in the country. Air mail will be delivered by helicopter directly from terminal airports instead of being trucked to downtown post-offices and redistributed by truck or train. Helimail service also will be used to deliver mail to airports from downtown post-offices, saving hours of time. Arrangements are also being made for utilizing the same service in deliveries of air express.

In the Los Angeles area, 28 suburban communities would be served by Los Angeles Airways, Inc., if the examiner's report is approved by the CAB.

Facts and Figures

America's swarm of civilian planes increased nearly 122% in 1946, jumping from less than 70,000 in 1945 to 85,000.

Five months' operation of Army Air Forces' experimental all-weather airline, on a schedule of five flights a week, between Dayton, Ohio, and Washington, D. C., resulted in a record of 98% completed flights.

Since Pearl Harbor the number of civil pilots in the U. S. has increased about 400 per cent, from 100,800 in 1941 to 400,000 in 1946.

More than five miles of wire hook up the instruments which collect test data on a new twin-engined transport plane.

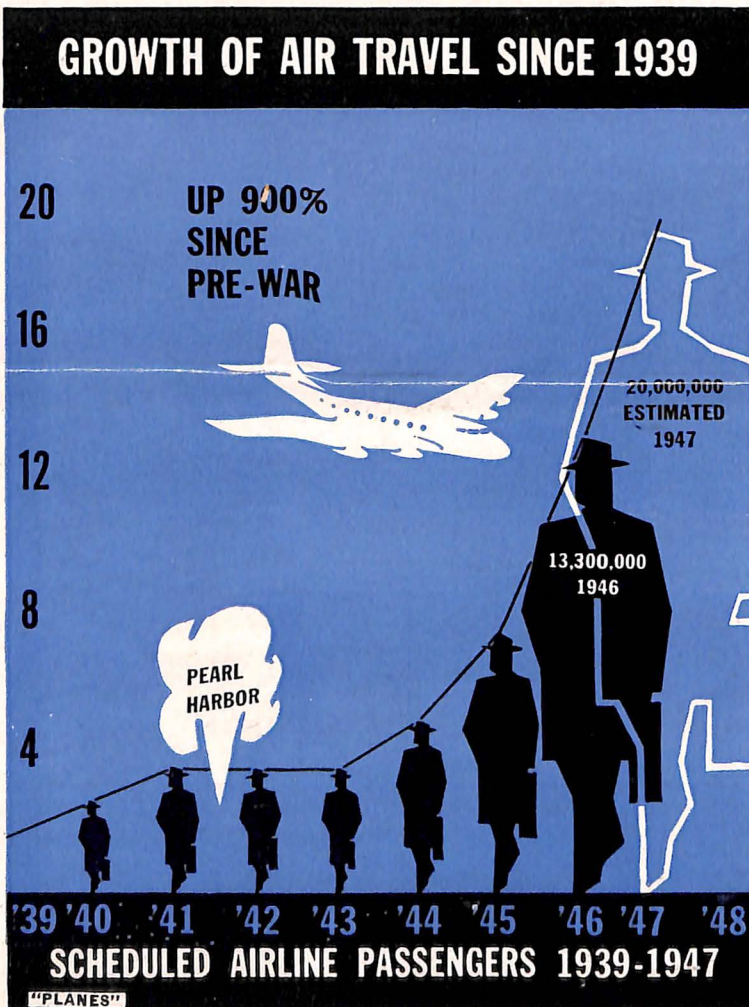
Operations of U. S. domestic scheduled airlines in 1946 resulted in only 73 deaths among 13,300,000 passengers.

During the first half of 1946 the number of private planes nearly doubled but private flying accidents increased less than 50%.

Test flights of one new transport consume more than a mile of movie film, expose, collect a record of instrument readings.

Insurance companies are preparing to offer air travelers trip insurance up to \$25,000 at five cents a thousand.

In four years the Army's Air Transport Command has cut its fatality rate nearly 63 per cent.



Answers to Planes Quiz

- (c) One new model has undergone test runs totalling 95,000 hours, that's nearly eleven years of test time.
- (c) In addition an airline pilot must undergo stiff flight and physical tests.
- True. Thousands of lives were saved during World War II by such devices at military fields in Britain. Now the government plans to install them at key civil airports.
- (c).
- All three advantages are provided by the three-wheel landing gear.
- (c).
- (c).
- True. Insurance companies a scheduled airline passenger ride 340,000 miles with less danger than a 500-mile auto trip.
- (c).
- (c).