



planes

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OFFICIAL PUBLICATION OF THE AIRCRAFT INDUSTRIES ASSOCIATION OF AMERICA

Air Records Fall As New Airliners Cut Travel Times

Hundreds of Americans have set speed records in modern airplanes. And most of them don't even know it.

They're the passengers in the scores of American-built, high-performance scheduled airliners that have broken U.S. inter-city speed marks in recent months.

Among them are the 60 persons who boarded an airliner in Los Angeles on March 30 — and disembarked to learn that they had crossed the continent faster than any other commercial travelers in history. The 2,474-mile trip took 5 hours, 51 minutes—only slightly longer than it takes a Sunday golfer to get out to the course, play 18 holes, and return home.

Official Record

Only the day before, 59 passengers aboard a scheduled airliner had broken the national record for the same trip, when they made the transcontinental crossing in 6 hours, 10 minutes. This flight was monitored by the National Aeronautics Association, and stands today as an official F.A.I. record.

The giant airliners which set these and other records have cut the nation's size (measured in travel time) down to a fraction of its former dimensions—and, at the same time, have set unprecedented safety records. Latest official figures show that it is at least five times as safe to fly in a scheduled air transport as it is to travel an equal distance in an automobile or taxi.

Inter-City Marks

Among the many other inter-city speed marks that have fallen in recent months are two official F.A.I. records—an airline flight from Los Angeles to Miami (2,341.3 statute miles) in 5 hours, 50 minutes and (See SPEED, page 3)

Training for Production

Last year, a major aircraft manufacturer hired 14,198 people.

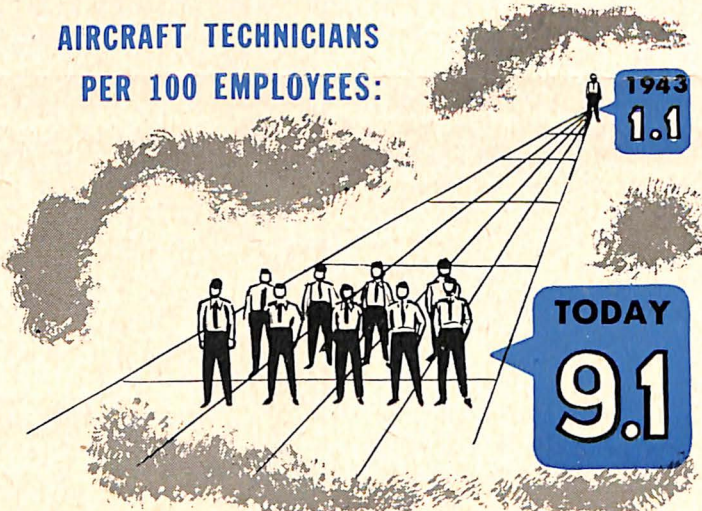
That made for a lot of training—5,700 assemblers, riveters and bench mechanics, 114 jig builders, 48 inspectors and others in many job categories.

Moreover, 1,600 persons already working as supervisors took courses in conservation of vital materials, latest industry developments, safety and efficiency, and techniques for giving their fellow workers a better understanding of the company objectives.

OUR SURVIVAL IN ANY FUTURE WAR DEPENDENT ON TODAY'S RESEARCH

MORE SKILLED TECHNICIANS TODAY

AIRCRAFT TECHNICIANS PER 100 EMPLOYEES:



Because of the tremendous complexity of modern aircraft, more technicians in all fields of science and engineering are needed in the aircraft industry. In 1943, for example, a typical aircraft manufacturer had one technician (such as radio and radar technicians, research mechanics and electricians, instrumentation mechanics and others) for every 92 employees. The proportion today is one out of every 11 employees.

'PLANES'

SOURCE: AIRCRAFT INDUSTRIES ASSOCIATION

"Thermal Barrier" Presents Challenge To Plane Designers

By DeWitt C. Ramsey
(Admiral, U.S.N., Ret.)

President, Aircraft Industries Association

We are faced today with the ominous possibility that in any future war decisive action may be taken in the very earliest days of the conflict.

Atomic bombs and thermonuclear weapons such as the one which recently blasted an island from the floor of the Pacific can be delivered to any spot on the earth's surface in a matter of hours. The delivery of such weapons and an adequate defense against their being launched upon us calls for the utmost skill, ingenuity and vision in the design of tomorrow's planes and missiles.

But in all of our planning—in building superior air power—we are faced with the relentless factor of time.

We can not escape the immutable fact that it takes on the order of seven years from drawing board to combat usefulness to produce modern fighter aircraft. Heavy bombers take even longer, and vast areas in the development and perfection of guided missiles remain unexplored.

Thermal Barrier

It has been 10 years since the military, the National Advisory Committee for Aeronautics and the aircraft manufacturing industry reached a decision to produce an experimental plane that would break through the "sound barrier."

Only now, seven years since this barrier was first pierced, are we realizing the product of that decision—a military plane in production that can exceed the speed of sound in routine operations.

And today we are faced with an enigma of even more serious import than the problem of the sound barrier. The "thermal barrier" which confronts us now is a new and formidable threat to further advances in flight. Heat—internal and external—is our newest and greatest challenge.

Tests have shown that at foreseeable possible speeds and altitudes certain of the materials used in today's planes would fuse and bring about a disintegration of the entire structure.

(See VISION, page 3)

Aircraft Workers' Cost-Cutting Ideas Save Taxpayer \$5.3 Million In 1953

A flood of cost-reduction suggestions from workers in 12 typical aircraft industry plants saved American taxpayers more than \$5.3-million during 1953.

These suggestions, made under "incentive" plans designed to encourage cost-consciousness and to promote efficiency, saved money for the taxpayer at the rate of almost \$10.15 every minute of every day throughout the year, according to a survey conducted by the Aircraft Industries Association.

Over 67,000 Suggestions

More than 67,000 suggestions were turned in by employees in the 12 plants as they sought means of cutting costs in aircraft construction. Earning money for themselves as they saved millions for the nation,

these workers were given monetary awards for workable cost-cutting ideas. Most awards in the industry are computed on the basis of a percentage of actual savings which the suggestions will bring during the first year of use.

In addition to the \$5.3-million saved last year, other hundreds of thousands of dollars were saved in the 12 plants by supervisory personnel who do not participate in the "incentive" programs.

Company Economies

One company estimated that 750,000 manhours were saved last year through suggestions submitted by employees. That is the equivalent of nearly nine men working 24 hours a day every day for the entire year. (See COST-REDUCTION, page 4)

PLANES

Planes is published by the Aircraft Industries Association of America, Inc., the national trade association of the manufacturers of military, transport, and personal aircraft, helicopters, flying missiles and their accessories, instruments and components.

The purpose of *Planes* is to:

Foster a better public understanding of Air Power and the requirements essential to preservation of American leadership in the air;
Illustrate and explain the special problems of the aircraft industry and its vital role in our national security.

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ALL MATERIAL MAY BE REPRODUCED—MATS OF ALL CHARTS ARE AVAILABLE FREE

Quality Air Power

Condensed from a speech by

The Hon. ROGER LEWIS

Assistant Secretary of the Air Force

The relationship between the Air Force and the industry is one of striking significance. Rising as it has in but a few short years, and based almost entirely on technological developments, air power could not have developed as it has but for the close and mutually dependent relationship between science, industry and the Air Force.

In 1949, as a result of the post-war rush to disarm and a failure to appreciate the nature of the threat against us, the Air Force was composed of only 42 wings, substantially equipped with World War II airplanes. The aircraft industry, which had responded so magnificently to the challenge of World War II, had been weakened by the wholesale and abrupt reduction in aircraft procurement with the cessation of hostilities.

In 1950 and 1951, suddenly awakened by the threat to our security, the air power buildup commenced. The urgency of the times was such that the buildup was planned upon war mobilization rates. Every available aircraft and accessory facility was put to work and greatly expanded with both private and government funds. In the desire to achieve the ultimate in modernity, improved aircraft, engines and accessories were snatched from the hands of the designer and placed in production.

Checked Communists

It was not the most economical way to do the job, and it certainly cost a great deal more money than it might have, but it did put us in a position to check Communism in Korea, and it certainly made a major contribution to the avoidance of a third World War. It was frantic, it was expensive, and some mistakes were made but it has resulted in an air strength now approaching 115 wings equipped with modern aircraft, and it has given us a sound base from which to continue our air power development.

This rapid buildup did inevitably, of course, create the problem of the build-down. Original production plans were based on the assumption that there would be a war before the buildup was completed. They did not provide a plan for the next step nor take into account the later problem of a very large aircraft industry suddenly confronted with a reduction of orders as the aircraft inventory was filled.

Fortunately, as it turned out, the original buildup plans were not attained, or we would in all likelihood have had on our hands about this time a problem similar to that of 1946 and 1947. The major production stretch-out of 1952 greatly reduced the seriousness of the problem by cutting down the peak rates of production and stretching the program over a longer period of time. In the last year, by a thorough review of all our programs, in which we carefully matched our production schedules to our buildup requirements, our production program has been further refined. We now have a situation in which both industry and the Air Force have programs well into the future, providing a period for the orderly transition from mobilization rates of production to sustaining and modernization rates of production.

Concentrate on Weapon Improvement

The creation and production of advanced weapons is a task of infinite complexity requiring the finest minds the country possesses. It requires whole-hearted cooperation among the scientists, the engineers, the manufacturer, and the user. It is a process for which freedom, democracy, and the American enterprise system are peculiarly well suited.

PLANE VIEWS

750 POUNDS WAS THE WEIGHT OF THE FIRST AIRPLANE, INCLUDING GASOLINE AND PILOT. A MODERN HEAVY BOMBER RECENTLY FLEW AT A GROSS WEIGHT OF OVER **400,000 POUNDS!**

WITH AFTERBURNERS, THE JET ENGINES IN AN ALL WEATHER INTERCEPTOR HAVE POWER EQUAL TO 150 AVERAGE SIZED AUTOMOBILES

3rd DEGREE - TO TEST SPECIAL PURPOSE TUBES USED IN AIRCRAFT ELECTRONIC SYSTEMS THE MANUFACTURER FREEZES THEM AT 65° BELOW ZERO; COOKS THEM IN 200° HEAT; AND GIVES THEM LANDING IMPACT SHOCKS EVERY 10 SECONDS FOR 200 HOURS. THE TUBES HAVE A LIFE EXPECTANCY OF **3500 HOURS...**

by Aircraft Industries Association

Now that we have the security which a good inventory of modern aircraft and its related equipment provides, we of the Air Force are going to concentrate our attentions on the development of improved weapons.

In warfare there is no room for the second best in equipment, however slight the margin might be, and we are determined to devote all our energies to insuring that the quality of the American weapon, like the quality of the American fighting man, is superior in all respects to that of any potential enemy.

The asset of time, however, has been completely obliterated by the power of atomic weapons developed in the past few years, and the great increases in range and speed of the aircraft with which they can be delivered. The United States, which previously has been safely isolated from the combat zone, is now a potential battleground. The force and the power of new weapons, possessed by both sides, is such that a new war may be as quickly decisive as it is terrible.

Must Have Force in Being

The implications of these new facts of our military situation to both the Air Force and the industry are clear. Unable to rely, as we have in the past, on production of important weapons after D-Day, we must now make certain that we have them on hand and ready before D-Day. Old concepts based on conversion from civil to military production after hostilities have commenced or the threat is clear, while continuing to be applicable for certain kinds of military situations, cannot be relied upon to deal with the big, short war threat. We must have both our striking and our defensive forces in being and in readiness for instant application.

It is gratifying to look back on our performance. The inventory is rapidly filling. Costs have started down and the most recently delivered equipment are, in most cases, substantially better than those which were first off the production line. We are getting and will continue increasingly to get more air power for less money. Science, industry and the Air Force are keystones of the American air power team, which must, in the future as in the past, press vigorously on in consonance with our national objectives and under our American free enterprise system to build and maintain the finest Air Force in the world.

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Vision and Ingenuity Necessary In Developing Modern Airpower

(Continued from page 1)

The recent flight in which a speed of 1,650 m.p.h. was attained in an American experimental plane points clearly to the gravity of the problems ahead. At this startling rate of speed—two and one-half times that of sound—the friction of the air impinging on the surfaces of the plane for a sustained period of time would increase the temperature on these surfaces to 350° F., the point at which the aluminum alloy commonly used in the manufacture of airplanes today loses nearly 25% of its strength.

The complexity of modern military planes is such that it is difficult to visualize the full scope of the task before us and the increasing demand for knowledge of new materials, sources of power, and fuels. Airplanes must be built to withstand temperatures, strains and stresses which were in the visionary stage just a few years ago.

Today's military aircraft must be able to take-off in desert temperatures in excess of 130° F., fly at altitudes over 40,000 feet where the temperature is normally around -65° F. and, yet, the materials of which the plane is built must neither expand nor contract to any appreciable degree.

The aircraft industry and the related sciences are constantly at work on solutions to these and many other problems, but it is only through a long-range program of adequate research and development that Ameri-

New A. I. A. Booklet Covers Extensive Studies on Safety

A complete study of recent technical and safety advances in aircraft construction has just been published by the Airworthiness Requirements Committee on Powerplant Installation of the Aircraft Industries Association.

The book, a revised edition of the "Design Manual on Aircraft Fire Protection for Reciprocating and Gas-Turbine Engine Installations," embodies the latest knowledge and experience gained in these fields.

The manual contains comprehensive data not available from any other source and is presented in a practicable and usable form for everyday application. It is based on the combined experience and design knowledge of the leading powerplant installation engineers in the industry, covering both turbine installations and reciprocating engine installations.

In addition to its value to the powerplant design engineer, the manual is a valuable aid to anyone concerned with aircraft systems.

The manual devotes considerable detailed attention to such topics as fire terms and zone definitions, prevention of occurrence of fire, prevention of spread of fire, fire detection, fixed fire extinguishing systems, and ventilation and smoke evacua-

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Our hope for survival in this perilous new age of devastating air warfare is dependent primarily upon the effectiveness of our defense installations and equipment and our ability to retaliate. These capabilities in turn are dependent upon the emphasis, support and state of progress of our research and development programs in the field of aviation.

Speed Records Held By Many Passengers Who Don't Know It

(Continued from page 1)

12 seconds; and an airline flight from Los Angeles to Jacksonville, Fla., (2,154.4 statute miles) in 5 hours, 29 minutes, and 33 seconds.

As transportation speed marks have toppled, airline passengers have flown from Miami to New York in 2 hours and 45 minutes; and from St. Louis to New York in 2 hours and 35 minutes. At the latter rate, a St. Louis businessman could leave his office at the end of a day—and still be in New York for an evening's business engagement.

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Planes Now on U.S. Drawing Boards Will Prove Bulwark of Air Power During 1960's

Military aircraft on the drawing boards of U.S. manufacturers today are millions of engineering hours and thousands of production hours away from actual flight.

Based on current experience, a jet fighter plane on which design work is begun this year probably will not enter squadron service until 1959—and will not be delivered in quantity until 1960 and later years.

This long time-element in the production of complex modern aircraft is the basic reason that today's research and development funds directly determine the quality of the nation's air arms six and 10 years in the future.

A typical fighter now operational in the Air Force, for example, is based on design studies that began in 1944.

In May, 1945, the Air Force gave a go-ahead to the manufacturer to design and construct three fighters on the basis of these design studies. (If Air Force orders were to be based on design studies underway today, the order for prototype construction probably would not be placed until late spring, 1955.)

In December, 1946, the Air Force placed the first production order before the initial experimental airplane had flown, thus accelerating

availability of the promising type. (Similarly, production orders for today's designs could probably be placed late in 1956.)

In October, 1947, the company first flew the experimental airplane, followed by an intensive testing program to explore aerodynamic problems. Many minor design changes were made to achieve best characteristics, and were incorporated in production aircraft then in design. (Using the same projected timetable, prototype flight tests of a plane based on current design studies could probably not be conducted until the fall of 1957.)

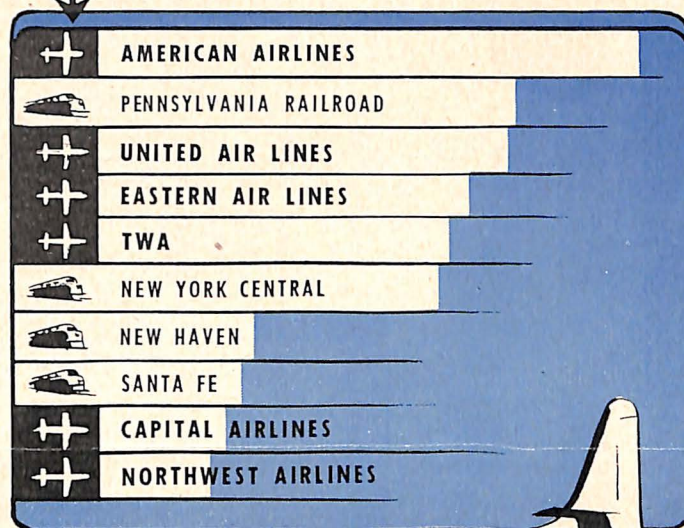
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AIRLINES DOMINATE PASSENGER TRANSPORT

Six of the 10 largest* passenger carriers in the United States last year were airlines.



As millions of Americans turned to air transportation, the 1953 list of the top 10 passenger carriers for the first time included more airlines than railroads. The largest single carrier for the second straight year in a row was an airline.

* Based on passenger revenues.

'PLANES'

by Aircraft Industries Association

Nation's Schools Operate Own Fleet Of 111 Airplanes

Colleges and universities in eleven states of this country own and operate a total of 111 airplanes, according to a survey just completed by the Aircraft Industries Association.

And two of the schools, the University of Mississippi and the University of Illinois, hold the distinction of being the only members of the nation's school system to own helicopters!

Forty-seven states and the Territory of Hawaii participated in the survey which was conducted to determine the type and amount of aviation education available through normal educational channels.

Of the 111 airplanes owned by these schools, all but six of them are single engine utility planes which carry from two to five passengers. The others are twin engine aircraft, three of which fall into the transport category and carry over 10 passengers.

Logging almost 14,000 hours in the air each year, these planes perform just about every type of job familiar to utility aircraft, ranging from actual airline pilot training to aerial application on school farm lands and aerial mapping and photogrammetry.

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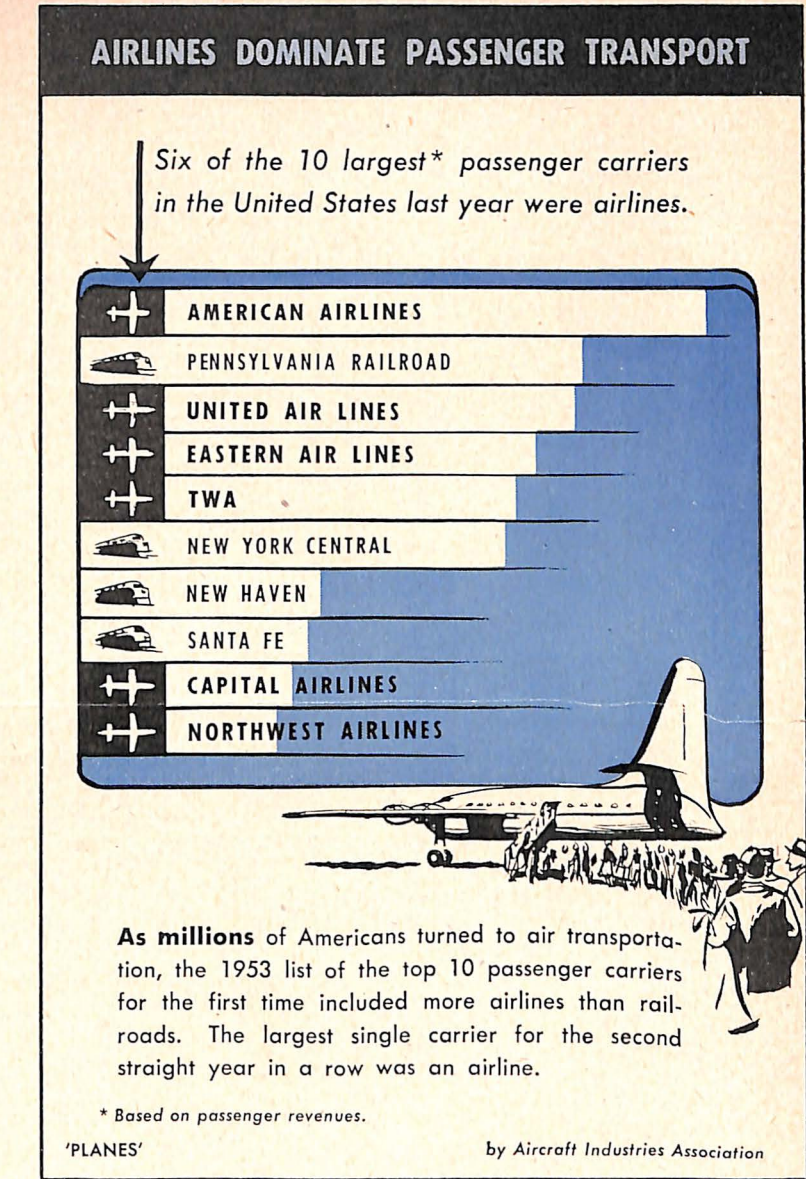
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Missiles Now in Quantity Production; Most Air Plants at Work on Program

At least 44 major U.S. industrial and scientific organizations are at work today on guided missile prime contracts for the armed services.

At the beginning of the year, these companies held unfilled orders for the pilotless, controlled aircraft amounting to well over a billion dollars, with deliveries gaining momentum each month.

In the words of one manufacturer, certain missiles already have "advanced from a research and development phase to quantity production." This same manufacturer reports that some missiles are being built on "mobile assembly lines" using "quantity production methods."

Variety of Missiles

Although the programs and weapons are still largely under security wraps, the Defense Department has indicated that production is underway on at least four surface-to-air, four surface-to-surface, four air-to-surface, and six air-to-air missiles.

Two pilotless bomber squadrons, equipped with the first offensive guided missiles to be turned over to tactical units of the Air Force, have been assigned to U.S. units in Germany this year.

In the United States, air defense installations are being located around certain major cities, and are equipped with 20-foot-long, pencil-shaped supersonic rockets designed to intercept and destroy enemy aircraft. These Army missiles are an integral part of a complex electronic spotting and guidance system intended to provide strategic areas with anti-aircraft protection.

Multi-Purpose Weapon

A Navy missile in quantity production resembles a sweptwing jet fighter, and can be launched and guided through the air by either ground or sea control stations, or by accompanying jet fighters. The 30-foot-long, radio-controlled missile is equipped with a device making it possible to land it undamaged after test flights—reducing the number of missiles needed for test programs by about 75 per cent.

The first large-scale production orders for guided missiles were placed during 1952. Since the beginning of fiscal 1950, appropriations for missile procurement have exceeded \$2.5-billion, exclusive of the amounts requested for the three services in the fiscal 1955 budget. These figures do not include additional millions of dollars appropriated for research and development.

A typical indication of the growth

Volunteers Fly 12,290 Hours On Search Missions in 1953

Civil Air Patrol volunteer pilots flew 12,290 hours (equal to more than 17 months in the air) on search and rescue missions during 1953.

The pilots and observers of the Air Force's official civilian auxiliary flew 6,505 individual sorties for the Air Rescue Service, racking up more than 60 per cent of the total hours flown by all agencies participating in 96 domestic air searches during the 12-month period.

of the missile program in the industry is the fact that, at one company, the dollar volume of development and production in the missile field during 1953 was more than double that of the previous year.

As the guided missile program grew in scope, the Aircraft Industries Association in early 1953 established a Guided Missile Committee to act in behalf of missile manufacturers in taking collective action on common problems. The Committee works closely with all the military services, and has been active in the development of suitable procurement specifications and requirements in this field. In addition, other committees of the AIA Technical Service work on problems of missile propulsion, frame standardization, equipment standardization, electronics and quality control.

An estimated 40 per cent of the companies holding prime contracts for work in connection with guided missiles are airframe producers, 25 per cent are components builders, 12 per cent are engine manufacturers—and the remainder are laboratories or plants of organizations not ordinarily engaged in aviation production.

PLANE FACTS

- The 10 busiest airports in the United States in 1953 were Chicago Midway, Miami, Los Angeles, Cleveland, Wichita, Atlanta, New York (LaGuardia), Denver, Dallas and Teterboro.
- In the two-minute flight of a test missile, instruments aboard frequently transmit to the ground as many as 60,000 readings.
- A turbine control, developed to solve fuel metering problems in jet aircraft, can solve the equivalent of 100 complex computations per minute.
- Thirty-eight per cent more utility airplanes were exported from the U.S. in 1953 than in the previous year. Forty-six foreign countries purchased 579 of the light airplanes from American manufacturers.
- Every minute last year, an average of 32 U.S. aircraft took off or landed at airports having CAA control towers.

Cost-Reduction Ideas Of Aircraft Workers Save Millions Yearly

(Continued from page 1)

tire year, or 27 men working regular shifts.

Another manufacturer reports that a suggestion on a method for rearranging the furnaces and hydraulic presses in its plant cut assembly time on one essential part by 42 per cent.

Typical of efforts by the aircraft industry to cut down on production costs and to develop improved methods in producing today's high-performance aircraft is a rivet conservation idea which cost only \$62.50 to institute. This one idea saved \$67,000 in the first 12 months it was in effect.

Over 125,000 Parts Go Into Modern Transport

One military version of a modern transport contains more than 125,000 different parts — not counting bolts and rivets.

This transport type—produced by a major U.S. manufacturer — has been built in 10 distinct civil and military versions, with thousands of differences to meet individual customer requirements.

TOMORROW'S PLANES MUST BE DESIGNED

TODAY!

1953 PLANE PRODUCTION
at a typical U.S. Aircraft Plant

42.5% designed in 1945



8% designed in 1946



7.5% designed in 1948



34.5% designed in 1949



7.5% designed in 1951



America's 1960 air power will be based on aircraft designs created years earlier. An indication of the lead-time required in the creation of air power is given by the fact that, last year, over 50 per cent of the aircraft built by a major U.S. manufacturer were based on designs originated in 1945 and 1946.

'PLANES'

SOURCE: AIRCRAFT INDUSTRIES ASSOCIATION