CONGRESS REGULATES AIRCRAFT COSTS

New Metal Stretcher, Glass Tools
Save Plane Makers Time and Money

Aircraft manufacturing, which already has contributed heavily to the consumer industries with development of light-weight materials and streamlined design, is now coming up with some revolutionary production techniques.

Two outstanding recent developments are a machine for "stretch-forming" sheet metal, and a process for making production tools from molded layers of fiberglas cloth.

Until the advent of the stretch-forming machine, many of the odd metal shapes required in planes were turned out by handicraft methods, something like those used in making fine kitchenware. New high-strength metals cannot be shaped by such methods. In addition, strength requirements for new super-speed planes are too exacting for hand-production methods.

ods. This not only means considerable savings in die costs, materials, time and labor, it produces stronger parts.

A sheet of metal stretched 12 per cent showed a strength increase of more than seven per cent.

The stretch former pulls the metal to desired length and thickness and wraps it around a mold in one operation. And it can handle sheets of metal up to 14 feet long. Its continuing development is expected to simplify not only production but design of new craft.

Glass replaces Steel

Plane assembly has been greatly simplified and the cost of production tools is being cut sharply by the development of laminated fiberglas jig and fixtures. Many of these special-purpose tools, once made of steel, are now produced by gluing several layers of fiberglas cloth together and baking them under low pressure around molds. Tools thus made are

Cold for Strength

Parts such as skin contours, air scoops, wing tips and engine cowling rings can be produced in a fraction of the time of hand production methods. This not only means considerable savings in die costs, materials, time and labor, it produces stronger parts.

In one case, for example, a sheet of metal stretched 12 per cent showed a strength increase of more than seven per cent.

Civil Air Patrol Shows Flood Areas
The High Value of Personal Planes

The Civil Air Patrol, which gained a new respect from people in stricken areas of the U.S. this winter, now is geared up to fight a new menace—floods.

Experts who have worked in the snow areas this winter say it will take a miracle of good weather to thaw the deep snows so gradually as to avoid floods. In the Chadron area of Nebraska, for example, these snowfalls reached 61.2 inches during the month of January alone.

Hedge-hopping CAP pilots, cruising over flooded areas, will be able to gauge the movement of flood crests and fly ahead and drop warnings to people in the likely path of water, as well as performing rescue, evacuation and supply missions. During the 27-day blizzard emergency, these personal plane pilots were out often from daylight to dusk, dropping messages containing emergency instructions wrapped around old spark plugs and trailing gaudy streamers, picking up snow-bound autoists and injured persons, as well as dropping food to humans and animals.

During the recent heavy snows many minor accidents and narrow escapes were daily fare of these men. In February, two men, Warrant Officer John Huff and Observer William O'Brien, lost their lives when their plane struck an unseen wire while

—See "Flood Patrol" page 4—

Tough Metal Meets Tougher Machine

Above photo shows stretch-former converting a sheet of metal into an engine cowling ring.

Cost Watcher

Tydings Cites

Profit Limits, Buying Rules

Written especially for Planes
By Senator Millard E. Tydings
Democrat, Maryland, Chairman
Committee on Armed Services
U.S. Senate

The Congress is deeply conscious of the need for keeping down costs of equipment as expensive as modern aircraft. Since the war, it has instituted several measures, together with existing controls, attempts to assure the taxpayer a maximum return for his dollar.

Both the present and the preceding Congress have become convinced that air power is the first line of national defense. By actual vote last year and by sentiment expressed this year, members of both the Senate

and House have evidenced their determination that our air arms should be equipped with an adequate supply of the most modern and up-to-date equipment.

Why Costs Are Up

At the same time, the Congress has shared the complexity and because so many costly and complex instruments must be installed in them to enable them to perform their varied military assignments. The radio, radar, navigational instruments and armament

—See "Tydings" page 4—
Skilled Aircraft Labor—A Priceless Resource

Skilled labor is the keystone of any industry and any nation. Without competent and trained labor, no industry can compete successfully in world markets. From the standpoint of national security, the nation possessing an adequate supply of skilled aircraft labor has a priceless national resource because this labor force is its key to actual survival.

Few, if any, industries require as highly skilled personnel as do the plants making airframes, aircraft engines, propellers, and the many instruments and accessories used in the airplane of today. The modern airplane is a carefully machined instrument, many parts of which require jewel-like precision and tolerances associated with a fine watch. The first impression of the spectator who examines the parts of a modern aircraft engine or modern aircraft instrument is amazement—that so careful a degree of machining is possible. What has so long been true of the engine and the instrument is now becoming true of the airframe itself as we go into speeds above that of sound. Since an airplane must be aerodynamically "clean," every part of the airframe must fit with a precision comparable to that hitherto associated with engines or instruments.

Obviously the precision attained in any part of the airplane depends upon the skilled workman who builds it. For this reason it has been a basic policy of the aircraft industry to inform the nation of the need for maintaining aircraft production at a level that will attract and retain within the industry this type of highly skilled workers.

In addition to the high degree of skill required, this industry probably requires a greater variety of skills than does almost any other. A walk through a modern airframe plant takes you along from seamstresses and upholsterers through welders, riveters, jig and tool makers, die sinkers, carpenters, electricians, and on to the wide variety of skilled technicians required by the aircraft engineering departments.

There is, of course, one other characteristic or attribute that aircraft skilled labor must possess. It must be able to produce in quantity, efficiently, and at low cost. Since the aircraft industry is probably the most carefully regulated and supervised of any large modern manufacturing industry, there can be no waste, and production schedules must be met. As proof that workers have met this challenge, one engine manufacturer recently passed the $300,000 mark in payments to employees under a suggestion award plan.

But even this is not all that is required of aircraft skilled labor. When, as, and if a national emergency occurs, the skilled labor then at work becomes a nucleus for the expansion that has to take place. The most skilled are graded upward and become foremen. Others become instructors. All have to help train the raw recruits who pour into aircraft plants when an emergency expansion gets under way.

No nation concerned over its survival can afford to dissipate its resource of skilled labor. No nation thoughtless of its national security can fail to plan how best to maintain at all times an adequate supply of employees trained in and practicing the latest aircraft production techniques.

L. D. Webb
Vice-President, Aircraft Industries Association of America, Inc.
AIA's Technical Service Trims Away Red Tape

Since 1908, when the Wright Brothers' first plane was purchased by the Army with a four-page contract, design requirements have mushroomed until the contract for a new jet bomber takes up more than 8,000 pages, eight times the bulk of that hefty volume, " Gone With the Wind."

Planes and their specifications have so increased in complexity that blueprints alone for a current medium bomber would cover a four-lane highway for a distance of 20 miles. Control of such paper work has become a big problem for the aircraft industry.

In order to help the government keep this costly paper work to a minimum and at the same time pool engineering know-how on industry-wide problems, some years ago the plane makers set up a Technical Service in their trade association, AIA. This technical staff, since it has spent many thousands of hours in conference with government administrators, scientists and engineers.

Cooperation Pays

Cooperation between industry and government engineers has paid big dividends in streamlined procedures. Hundreds of duplicating dividends in streamlined procedures. And liaison with the military services has prevented innumerable hitches. Government engineers has paid big dividends in the cooperation of know-how, for example, small, specialized problems, such as those with which AIA's Technical Service continually wrestles.

Continuity in production reduces unit plane costs

WHEN 1ST PLANE COSTS

$5,000,000

100TH PLANE COSTS $800,000

200TH PLANE COSTS $650,000

500TH PLANE COSTS $500,000

Materials Ordered

"Planes" productivity increases with volume

"Planes"

Materials Ordered "Planes" months in advance

Raw materials going into our newest and fastest Air Force jet fighter were ordered as much as 10 months ago, the builder of this craft reports.

Many aircraft "raw materials" are really processed or semi-finished, hence they must be scheduled many months before they are to be used. They come in many different forms—sheet, bar, tubing, wire, castings, forgings, etc.

Into each of this fighter type go 4,650 pounds of aluminum, 1,300 pounds of steel, plus plastics and other materials. These are used to make 165,000 individual fabricated parts, fastened together with about 315,000 rivets.

Lucky Lady Proves Value of Airlines

Air Force officials point out that the recent non-stop world circling flight of the B-50 bomber, Lucky Lady II not only demonstrated the feasibility of in-flight re-fueling on long-range flights but also improved the value of global air-route support facilities.

But for the existence of a world network of routes as developed by U.S. civil and military air transport operators, world-ranging flight never would have been accomplished, the Military Air Transport Service believes.

MATS' support sources—All Weather, Airways, Communications, and Air Base—in cooperation with the Signal Corps, along the entire route kept the crew of the Lucky Lady in hourly contact not only with the bases en route but also with their Carswell headquarters in Fort Worth, and Strategic Air Command Headquarters in Omaha.

Vincent Bill

Contrary to popular belief, the "70-Group" air force bill introduced by Rep. Carl Vinson (D., Ga.) does not order the building of a 70-group Air Force. It would authorize the Air Force to build up to 70 groups. It would define broad makeup of such a force. Actual attainment, however, depends on funds appropriated by Congress.

The difference is like that between design and financing of a new home. Once the architect's plans are approved, financing must be arranged. In this case, the Vinson is the architect and Congress the financing agency.

The following is an outline of major provisions in the Vinson "70-Group" bill:

1. House Bill 300 authorizes a first-line force of 70 groups, plus 22 specialized squadrons, supported by 61 reserve groups and auxiliaries; a personnel strength of 508,000 officers and men; a complement of 24,000 planes or 225,000 airframe tons; procurement of 5,000 planes or 150,000 airframe tons per year; expenditure of funds over a five-year period.

70,000,000

As jet engines are improved, buyer gets more power per dollar

"Planes out!"

The following six years of meetings and coordinating of know-how, for example, non-damaging hydraulic fluids, soon will go into service, a very important safety feature for both civilian and military aviation. In another case, industry propeller and engine specialists spent about 5,000 hours over a period of seven years in study and conference to develop standards for propeller control clearance.

With the help of the paint industry, studies now are being made to produce a fire and heat-resistant paint for planes. And a recent New York meeting ended a year of idea exchange and tests to solve a problem of engine oil leakage.

In such a rapidly-changing technology as aviation, a whole new range of performance and utility can be opened with the solution of seemingly small, specialized problems, such as those with which AIA's Technical Service continually wrestles.

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

1. How many parts, including rivets, engines, etc., would you guess, are contained in our fastest jet fighter (a) 150,000; (b) 200,000; (c) between 500,000 and 600,000?

2. How many pounds of aluminum in a B-50 (a) 1,200; (b) 2,700; (c) 61,000?

3. In the demobilization following V-J-Day, the Air Force dropped 243 war strength groups to (a) 48; (b) 15; (c) 51 groups.

4. What purpose did President Truman create his Temporary Air Policy Commission in 1947?

5. True, False. In one day La Guardia Field consumes as much gasoline as the Berlin Airlift requires in a month.
TYDINGS
(Continued from page one)

in a 1949 bomber cost more than a complete bomber, including the few instruments then required, supplied to the Air Force in 1934 or 1935. Everything about the modern plane is far more costly. The giant jet engine, producing the equivalent of 5,000 horsepower, costs many times the reciprocating engine of 1933-34, which turned out less than 1,000 horsepower. Plane speeds have tripled in that period.

Three Steps

While these examples explain why the cost of aircraft purchased by the military services has mounted, they do not diminish the responsibility of Congress to make certain that costs are held at a minimum. To fulfill this responsibility, the Congress already has taken three important steps and is considering a fourth.

Last year, for example, Congress completed the Military Procurement Act. This law completely revised the statutes governing the procurement of such equipment as aircraft. It provides business-like, flexible procurement procedures. Yet, it also retains all of the checks on purchasing that have been proven to contribute to efficiency and economy.

Congress last year also adopted the Renegotiation Act of 1948. It requires all current contracts for aircraft and other military equipment to be subjected to renegotiation procedures similar to those followed during the war. This renegotiation procedure insures a careful scrutiny of all costs and expenditures made by the aircraft companies while engaged in the production of equipment for the Armed Services. It also guarantees that any excessive profits earned on military contracts will be returned to the government.

GAO Checks

In past years Congress established at least two other extremely important checks that still control costs of aircraft and other military equipment. It set up the Government Accounting Office, which surveys and reviews all aircraft contracts in which costs are paid directly by the government. The other check on costs is the investigative powers of the Congress.

The House and Senate Armed Services Committees meet regularly when Congress is in session and often authorize extensive surveys into the operation and accomplishments of the Armed Services to be conducted when Congress is in session. In addition, the House and Senate Committees on Expenditures in Executive Departments both maintain continuing full-time reviews and surveys of the operation of all the executive departments, including the Armed Services.

No Scandals

In this connection, it is well to recall that there have been no scandals uncovered in the purchasing or production of aircraft during the past decades even though billions of dollars were expended for aircraft during the war. I have also noted with considerable interest that the searching investigations of the Hoover Commission contain no criticism of the purchase or procurement of aircraft, even though aircraft is easily the most expensive single item of equipment required for our national defense.

While all of these laws and procedures are vital forces for economy, Congress is considering still other methods of reducing defense costs. Just now both the Senate and the House are considering a long-term aircraft program such as was recommended last year by the Congressional Aviation Policy Board and the President's Air Policy Commission. After extensive surveys and studies, both of these groups reported that a long-term program of aircraft procurement was by far the most important single step that could be taken to hold down aircraft costs. I am hopeful that the Congress will adopt such a program this year so that every possible measure for economy that can be put into effect has indeed been enacted.

By all of these steps the Congress has clearly shown its concern over defense costs and particularly the cost of aircraft equipment. I believe that the Air Force and those in charge of procurement for Naval Aviation and the aircraft company managements all are deeply conscious of their responsibility to hold down costs. The combined efforts of the Congress, of the Armed Services and the industry are required to achieve the maximum in economy, since without such economy the country may not be able to afford the air power it must have for survival.

Development of Carriers and Naval Planes Since 1922

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<td>3,000 LB. PLANE</td>
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<td>1934 - Ranger Class</td>
<td>8,000 LB. PLANE</td>
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<td>1942 - Essex Class</td>
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Delivering planes farther and faster with larger bomb loads

"Planes"

Mercy Wings

Flood Patrol

(Continued from page one)

while attempting to evacuate a ranch family. This devotion to duty, incidentally, carries with it no promise of disability payments or pensions from the government. All the CAP receives is the gas and incidental supplies needed for the job.

Snow Rescue

Typical of the heroic missions carried out by CAP was the time a CAP pilot spotted a distress signal at a school house almost buried in the snow. After the hazardous landing, he discovered a teacher and two pupils huddled in the doorway. Together, they tramped a run way in the snow and he hauled them out.

In these relief missions, however, it isn't just the pilots who work around the clock to help sufferers. Supporting these light planes are ground crews. In the Nebraska emergency these ground crews worked with shovels, tractors, and power plows to keep runways open. At Scottsbluff, one of the hardest hit areas, the whole town gunned for two days and pitched in with the CAP to dig a path to the airport and clear the runway.

Facts and Figures

An American test-pilot recently performed a complete loop with a helicopter. It was the first such maneuver in a helicopter.

A new model jet fighter contains 7,000 feet of electrical wiring, 1,500 feet of tubing.

A Pennsylvania flying school offered free flying instruction to anyone over 60.

A leading plane producer has announced a new 300 mph cargo plane with a direct operating cost, one stop coast-to-coast, of 4.6 cents per ton mile.

Capacity of a new freight plane is so great that 60 of them could take the place of 210 standard Berlin Air Lift planes.

Since the Wright Brothers' first flight, there has been a seven-fold increase in efficiency of planes.

It took 40 years to progress from the simple Wright Brothers' engine to a 3,000 h.p. engine. In the last five years, however, power has increased from 3,000 to 10,000 h.p.

Production of a typical new fighter plane requires about 13,500 special tools.

Answers to Planes Quiz

1. [c].
2. [b].
3. [b]. And aircraft production dropped from an annual rate of 100,000 planes to 1330.
4. President Truman asked his commissioners for "an evaluation of the degree to which the United States should follow in order to . . . greatest possible basis of self-sufficiency." He emphasized danger to our security and welfare from lowered plane production.
5. True. Average daily consumption is 175,000 gallons.
6. "Elevos" are movable control surfaces on flying-wing type aircraft. Located along the trailing edge of the wing, they combine function of elevator and aileron.
7. [c]. In a balloon ascension in 1935 by Anderson and Stevens.
8. [b].
9. True. He jumped from a balloon at 2,000 feet.
10. True.