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RECENT ADDRESSES

THE PROMISE OF HELICOPTER TRANSPORTATION*

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THE helicopter is so new that most of us who, for example, were in World War II, never even heard of it until late in the war, if at all. It was not until the first year of World War II that a helicopter was flown successfully in the Western Hemisphere.

Remarkable it is, then, that less than 10 years after the war, the helicopter manufacturing industry had progressed to where 11 different helicopter models were in production, 14 were in the prototype stage, and 9 were in the design stage. Fifteen thousand people were employed in their manufacture, and sales were averaging better than \$150 million a year. The manufacturers' backlog of helicopter orders had reached \$550 million (more than $\frac{1}{2}$ billion) by the end of 1954.

Moreover, in this short span, an unbelievable amount of safety has been built into this vehicle. So much so that in 6 years of scheduled helicopter passenger service, in Europe and the United States, there has never been a passenger fatality; and whereas one of the major accident hazards in fixed-wing flying is engine failure, our records show that there has never been a fatal accident, due solely to engine failure, in any kind of civilian helicopter operation, scheduled or nonscheduled, commercial or private.

Truly this is an historic record and I am very sure every person in this room is proud, either to have had a part in creating this record, or to join with me in tribute to the engineers, designers, manufacturers, workmen, operators, and pilots responsible for it.

Government's Role

The United States Government has not, of course, been a disinterested bystander to this remarkable development. The military departments have encouraged and paid for the major development costs of this vehicle, and the Civil Aeronautics Board has footed the subsidy bill for the operations of the three scheduled helicopter lines in Los Angeles, Chicago, and New York.

The development costs have run between \$100 million and $\frac{1}{4}$ of a billion dollars to date and the present subsidy bill is now almost \$3 million a year.

Some of you may think the civilian branches of Government are always behind the times. So it may come as a surprise to be reminded that the Civil Aeronautics Board scheduled its first prehearing conference in a helicopter application as long ago as April 1944. That was in the Los Angeles Helicopter Case. Because the war still was in progress and there was no equipment, the hearing was postponed. But the Board, with the support of the Post Office Department, did award a certificate to Los Angeles Airways to operate a scheduled helicopter mail service in May 1947. At that time the Board said in its published opinion:

"We do not believe that its present high cost of operation alone should deter the experiment since a more economical helicopter may be anticipated just as more economical conventional aircraft have been developed."

* Remarks to the Eighth Annual Convention of the Helicopter Association of America, at the Sheraton Palace Hotel, San Francisco, California, January 24, 1956.

"... the potential of the helicopter in commercial air transport is unknown and whether the service proposed can be maintained on an economically sound basis with substantial public benefit is a matter which can be established only by experience."

Subsequently, Los Angeles Airways was authorized to carry passengers.

The following year, 1948, the Board certificated the Helicopter Air Service in Chicago. In rebuttal to evidence showing that trucks could perform the service for \$75,000 a year rather than the \$437,000 estimated for helicopters, I quote again from the Board's opinion, not merely to document the Board's vision and courage (because these cases were decided during a period of airline economic depression) but to indicate to you that the Board has been, and still is, an active partner in the helicopter venture, and is fully as anxious to develop helicopter transportation as you are. The Board said:

"It is, of course, clear that the operation of trucks could be conducted at a substantially lower cost to the Government than the helicopter service. However, there are, we believe, considerations of broad national interest which justify the inauguration of the proposed helicopter service on an experimental basis. Moreover, further development of the helicopter and the experience to be gained from the operation are desirable in the interest of the national defense." (1948)

In 1951, the Board certificated New York Airways to carry both mail and passengers, and there is now pending before the Board a passenger application by the Chicago carrier.

The first two certificate authorizations, in Los Angeles and Chicago, resulted from unanimous Board decisions. However, the Post Office Department did not support the New York application and the Board Members were divided four to one.

The then Chairman of the Board dissented on the grounds that the two experimental operations in Los Angeles and Chicago would give the Board and the industry as much information as three operations; and that the Board should not further increase the Federal Government's subsidy for this form of transportation.

Last year, the Post Office did support renewal of the Chicago certificate, but added that it did not favor more than the present three operations pending production of a more economic helicopter.

Return on Investment

In return for this large investment by the military and the Civil Aeronautics Board, the people of the United States have received many benefits. Everyone knows of the 22,000 servicemen rescued behind the lines in Korea; and of the dramatic helicopter rescues made during the floods in New England last Fall, and just North of here in California last month, when hundreds of lives were saved. These benefits represent savings in human lives which can never be measured in dollars.

Without reciting the many combat innovations introduced into the Korean War by the use of the helicopter, suffice it to say that the development of this machine has revolutionized the tactical deployment of combat troops.

A surprising amount of the military progress of the helicopter is due directly to the rigorous experimental laboratory provided by the civilian commercial helicopter operator. The military testified at great length, at Board hearings this past year, to many specific examples of new learning from the experience of civilian operators. One of the most dramatic was the ungrounding of a large part of the military helicopter fleet at the height of the fighting in the Korean War. The service life of the tail rotor gear box on the H-13 had been listed at 300 hours. The fleet was grounded for lack of replacement gear boxes. Based on the experience of one of the civilian helicopter operators in using these gear boxes 600 hours, the Army

was able to double their service life by a simple field order, and thus put the fleet into the air again without jeopardizing the life of a single pilot or soldier-passenger.

Likewise, the Army has used civilian operators to build up engine time quickly in order to evaluate solutions developed by manufacturers to overcome spark plug fouling and valve burning. The useful life of Army rotor blades was doubled by an increase from 900 to 1800 hours. The civilian operators also have saved the military untold man-hours, and many dollars, beyond estimation, by furnishing the military with complete data on fuel consumption, and on time studies for removing and inspecting engines and rotor blades and for major overhaul.

The passenger operations of the civilian carriers also have earned widespread public acceptability and they have commanded the respect of the major airlines, practically all of whom have entered into interline passenger agreements with New York Airways.

Truly, the helicopter has won the hearts of the American people.

So much for the past, and so much for the Board's role in that past. Now, what of the future?

Jet Airports and Traffic Jams

Paradoxically, I believe that the fast-moving jet age in long-haul air transportation will usher in the slower-moving helicopter age in short-haul air transportation. The week before last, the Civil Aeronautics Administration sponsored an all-day meeting in Washington to discuss the problems which will arise from the use of jets in commercial air transportation. After that meeting the Airport Operators Council stated:

"We know that turbojet aircraft, in their present configuration, without effective noise-reducing devices, will not be acceptable to the public. We believe that the operation of such aircraft into congested areas could jeopardize the success of any program for the use of turbojets."

This statement was endorsed by the American Association of Airport Executives, the National Association of State Aviation Officials, and the American Municipal Association.

Recently the Port of New York Authority refused to allow the Boeing 707 prototype and the British Comet III to land at New York's International Airport. The Port Authority explained that it was having enough trouble with its neighbors over the noise from conventional piston engines without playing host to the two big jets.

If the noise problem is not solved, there will be a growing demand to locate future large jet airports farther away from downtown.

But, aside from noise, there is—air traffic! Year-end estimates show that air traffic increased 20% in 1955, more than 50% greater than the increase the previous year. Moreover, in 8 years the number of takeoffs and landings recorded by the CAA increased from 4 million in 1946 to 12 million in 1954, a 3-fold increase in total traffic. The estimate for 1960 goes to 18 million takeoffs and landings, and these figures do not include traffic at military airports, nor the millions of takeoffs and landings at small fields, for which the CAA keeps no records.

The conclusion seems inescapable that the advent of the jet transport, and the continuous increase of air traffic, will increase the need for the large jet airports of the future to be farther from downtown.

It is also doubtful whether the air traveler is going to be satisfied to fly from coast to coast in 4 hours, and then be forced to spend another 2 hours getting his baggage and fighting surface traffic to and from the airport.

Even now, with piston engines, and notwithstanding the excellent location of the new San Francisco airport, the average airline passenger who flies between Los Angeles and San Francisco in one and one-half hours will spend more time than that riding to the airport, checking in, getting his baggage after the flight and riding into town from the airport. The introduction of jets will only serve to emphasize this disparity, and point up the futility of linking fast intercity air travel with slow airport-to-city surface travel.

You hardly need to be told that the helicopter supplies the tailor-made answer, provided, of course, that we have heliports in or near city centers. The helicopter also can relieve much of the air traffic jam if it comes into general use in the short-haul market, because it flies in a separate traffic pattern of its own, underneath the flight patterns of fixed-wing aircraft.

Short-Haul Market

Still another market, a fabulously large market, as yet untapped by air transport, is crying for the helicopter. About 438 million passengers in 1954 traveled by common carriers on short-haul trips of less than 250 miles. The airlines carried only 2¼% of these short-haul passengers, whereas the airlines carried 75% of the passengers who traveled over 1000 miles.

Stated another way, 89% of all passenger common carriage in the United States is on trips of less than 250 miles, and the airlines carry only 2¼% of that mass market. The public has been amazed by the unprecedented growth of the airlines in the last 10 years. Yet, the airlines carried only 32 million domestic passengers in 1954, short-haul plus long-haul, compared to the 438 million who traveled, almost entirely by railroads and buses, in short-haul travel. Stated a third way, as great as the airline growth has been, railroads and buses still carried 14 times as many passengers in short-haul transportation alone as the airlines carried in short-haul and long-haul put together. I repeat, *as great as the airline growth has been, railroads and buses still carried 14 times as many passengers in short-haul transportation alone as the airlines carried in short-haul and long-haul put together.*

Historically, the air transport industry has been unable to compete in the short-haul market because of the time it takes to travel over congested surface highways between airports and city centers, and because of the increase in toll roads. If Congress enacts a new Federal highway program, new impetus will, of course, be given to the construction of additional super highways. Again, the helicopter is tailor-made for this type of operation, but, again, only if it is furnished with centrally located heliports.

Short-Haul Segments

In a paper presented to the Airport Operators Council meeting at Tampa, Florida, in April 1954, L. Welch Pogue (Washington attorney and former Chairman of the Civil Aeronautics Board) and Grahame H. Aldrich (Director of Special Projects, Air Transport Association's Division of Air Transport Economics) concluded that if a suitable helicopter had been available, it would have replaced 37% of all fixed-wing aircraft schedules in 1953. Last year, Mr. Aldrich presented a study showing that at the 24 largest airports in the United States as many as 29% of all flights depart for or arrive from cities less than 125 air miles away. At the 32 next largest airports, as many as 48% of all flights are operated to or from cities less than 125 air miles away.

Inasmuch as these 56 largest airports handle 82% of the industry's total revenue passengers, it follows that presently existing flights from the major airports of the nation actually serve an unbelievably large number

of short-haul *segments* for a practically negligible amount of short-haul *traffic*. At the remaining 495 airports from 60 to 98% of the flights operate to or from cities less than 125 miles away.

The cities on both ends of these 125-mile segments would receive far better service with helicopters operating from mid-city heliports than they can possibly ever get with fixed-wing schedules between airports with the attendant agonies of slow surface travel over congested highways at both ends of the trip.

Manufacturers' Market

The domestic scheduled airlines now have in service 627 twin-engine aircraft. If the operators of these aircraft could be induced to replace them with 35- to 50-place multi-engine helicopters selling for \$500,000 to \$750,000 each, the helicopter manufacturing industry would have a new, immediate, potential civilian sales market of \$470 million.

Moreover, if the air transport industry ever moves into the 438 million passenger short-haul market, think of the additional possibilities open to the helicopter manufacturing industry! The Aldrich study forecasts the possibility that inter-city helicopter services, operating out of downtown heliports, could capture 50 million of this 438 million passenger market by 1965. That would automatically more than double the number of air passengers now carried by the entire domestic air transport industry, long-haul and short-haul. If such a development resulted only in doubling, in helicopters, the capacity of the present airline fleets of twin-engine aircraft, the sales potential for the helicopter manufacturer would soar to almost a billion dollars.

Heliports and Helicopters

However, this goal can never be reached without downtown, mid-city heliports. For, in order to compete with surface carriers, the helicopter operator must also offer passengers as convenient access to heliports as they now have to railroad stations and motor bus terminals. Moreover, without mid-city heliports, the time saving of rotary-wing aircraft would be lost in the city-to-airport surface travel.

Both of the scheduled airlines (National and Mohawk) which experimented with the Sikorsky S-55 as an adjunct to their fixed-wing fleets abandoned operations, because of the small capacity of the vehicle (though they were prepared to assume some losses) and especially because of their inability to obtain mid-city heliports in New York City and Miami Beach. The President of Mohawk Airlines stated his belief that the future of his company lies in the operation of large, twin-engine transport helicopters, but added a comment certainly of interest to everyone at this Convention. He said:

"Were I a helicopter manufacturer, my sales staff would be more concerned with community education as to the potential of scheduled helicopter service . . . and of community planning for it, than with selling . . . airlines on the potential of the machine."

When it is remembered that such European cities as London, Brussels, Rotterdam, and Bonn now have centrally located heliports, we must conclude that the city planners and city fathers in our own country, who are not ready for this new advance in aviation, are retarding the logical and legitimate development of the helicopter.

Likewise, the goal of developing helicopter passenger operations cannot be reached unless the manufacturing industry produces a multi-engine 35- to 50-place helicopter which incorporates, at least substantially, most of the characteristics recommended by the Rotorcraft Committee of the Air Transport Association. The British also have expressed essentially the same

requirement, a 45- to 50-place, twin-engine, quiet vehicle with a cruising speed of 150 miles an hour.

The subsidy figures required to operate the small helicopter now in scheduled service speak for themselves in pointing up the need for a larger vehicle. The average price of each passenger ticket sold by New York Airways is \$7.44. The CAB subsidy per passenger carried by New York Airways averages \$48.99. The figures for Los Angeles Airways are even higher.

It was indicated at the manufacturers' panel yesterday that all the manufacturers are working toward our desired goal, and I understand that Bell, Piasecki, and Sikorsky now have helicopters which come close to meeting these requirements.

Twin engines are required, not only for safety, but in order to keep the take-off and landing approach line in the downtown areas of large cities as small as possible. Such a vehicle also needs engines designed for it. Maintenance costs on the piston engine presently in use by passenger-carrying, scheduled helicopter operators are three times higher than overhaul costs for the same engine when used in fixed-wing aircraft. (You know the reasons for this better than I do, but I assume it's because of vibration and the necessity for operating with high-power settings.)

Gas turbine engines, on the other hand, seem to be ready-made for rotary aircraft. In addition to being smaller and lighter, the turbine operates at optimum fuel consumption at the high power settings required by the helicopter. The turbine is easier to service, creates less cabin noise, and causes less vibration. It should thus contribute to greater passenger comfort, to a longer operating life for the engines and air frame, and should reduce pilot fatigue—not an insignificant factor in presently designed rotorcraft.

Horizon Unlimited

Yes, the future horizons are indeed unlimited—or if limited, then only by the timetable of American industry to meet the challenge of our time—to meet that challenge by producing the helicopter which will open up the new helicopter transportation age. When American industry has met that challenge, and we have a multi-engine, economic, 35- to 50-place helicopter, which has a reasonable chance of operating commercially without government subsidy—when that challenge is met, I am certain you will find the Civil Aeronautics Board, now as in the past, not only willing, but anxious to join with you in doing its part to further this new dimension of air transportation into the wonderful era we all know it will be. I know that no one can stop your progress.