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Reed G. Landis

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AIRLINE AIRPORT CAPACITIES†

By REED G. LANDIS*

My acquaintanceship with the National Association of State Aviation Officials dates from the first meeting held to discuss whether or not there should be such an organization. I am exceedingly proud of the fact that I played some part in putting the group together and served as a member of its first staff of elected officers. I know that it has contributed much to the progress of aviation in the United States during its lifetime and that it will continue to do so in the future. Those contributions have taken the form of original thinking and planning, of development of man power which has, in turn, been utilized by commercial and governmental organizations and by the equally valuable function of safety valve and brake on the unbridled enthusiasm and vision of some of us.

It seems to me that "airport capacity" obviously means the ability of an airport to do its job from the viewpoints of aeronautics, civics and economics. I have chosen to talk about airport capacities because in the minds of the general public their local airport symbolizes aviation, and what we say here about airport capacities may possibly apply to other factors of the aviation industry.

The aeronautic capacity of an airport is no simple matter, dependent as it is upon the area, its approaches, the equipment placed on and about it and human control exercised over its use. Most of these matters are subject not only to idealistic measurement and interpretation but to the very firm and inflexible economic law which prohibits a greater community development of resources than will produce for it. The physical things in connection with the aeronautic capacity of an airport are pretty well under the control of the Federal Government and in this manner we avoid conflict and duplication of regulations, rules and restrictions and achieve what is probably the finest system of airports any place in the world. Unfortunately, many of them have been outmoded in one way or another and must now be brought up to date to make usable the technical lessons learned as our industry has grown up. The control of the airports by their managers and the subordinates working under those man-

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*Regional Vice President, American Airlines, Inc.

agers varies as much as does the quality of the airport, but the overwhelming proportion of our airports are today quite well managed and with the rapid extension of air traffic control and tower control, with its accompanying radio installation in scheduled, unscheduled and military aircraft, we are achieving a good all-weather control which has contributed substantially to the growth of this industry.

The civic capacity of an airport is, to my mind, the ability of the airport to make available all of the benefits of aviation to the citizens of the community it serves. It is unnecessary to detail those, but I want to remind you again that they are in four general classifications. First, because of the extreme desire to survive, is the defensive value of military utility. Then follow the dual benefits accruing to the public, whether it flies or not. The other two are the obviously important economic and social advantages from scheduled and unscheduled operations.

Of the dual benefits gained by the public as a whole, the first is the recreational angle, proved by the fact that there are millions of people each week driving or otherwise going to their local airports to indulge themselves in the enjoyment of watching this new form of transportation perform. There is no question but that these people gain a broadened viewpoint and an inspiration which has value of an immeasurable sort in connection with their daily jobs. They see an industry, born in the minds of men who yet live, which has pioneered, and successfully so, into a new medium of travel. There is romance still in aviation for the layman, and I for one admit that there is romance in aviation for this old timer at least.

The other civic benefit gained by the rank and file who do not directly utilize air travel is premised on the fact that aviation is transportation and as transportation it contributes to the scale of living of all in the community it serves. This is both a threat and a promise—a promise because its proper application to the community life will enhance the scale of living of the community's citizens, and a threat because its absence or improper application in a community will mean that other communities competing with that one and having this modern tool available will forge ahead at the expense of those to whom aviation is not at hand.

This raises the question of air transport expansion. Scheduled operation now serves just over 200 cities. It is said that nearly 3,000 stops would be required if all our citizens were to have scheduled operations conveniently at hand. No one can now forecast the form in which this extended service will grow—but it is obvious that

airports will be involved. The Civil Aeronautics Authority has studied that airport development program. It has outlined a long range plan. That or a similar plan should be undertaken energetically. To the degree that any of our territory or our people suffer from the lack of modern transport, our nation suffers a reduction in efficiency—and these days we must achieve the utmost in efficiency in the world or suffer dire consequences of an appalling character socially, politically and economically. As transportation, aviation expansion is as vital in the solution of this generation's problems as any other single factor.

The economic capacity of an airport contains several factors. The intangible ones have been outlined above under our discussion of civic capacity. The tangible forces are largely a matter of book-keeping and cover the age-old combative forces, costs and income. A modern airport capable of serving scheduled, unscheduled and military operations with all of the aids and facilities required for such service is no small undertaking, financially. The capital investment, with its interest and amortization, is an important factor in the city budget of any community. The maintenance and operating costs go up into many thousands of dollars, varying, of course, with the scale of operations and also to no small extent with the type of original installation and investment involved. The capacity of the airport to gain sufficient earnings to meet its expenses is the problem now facing almost all of us in aviation. If we are an airline operator we are faced with a desire on our own part to pay as much of our share of that load as we can possibly carry. If we are an airport manager we are endeavoring to balance our budget to the best of our ability. The income of an airport should be derived from those who benefit from its operation—the scheduled operators, the unscheduled operators, including military, and the general public, predicated on the extent of their operations at that airport. It appears that the most equitable method of determining such remuneration for scheduled operators is on the landing fee basis—a basis which gives the operator a known factor in his costs and gives the airport a distinct and real chance to improve its financial position as business grows. Certainly some similarly mutually equitable basis should be devised for unscheduled operations. The public who benefits and distinctly so, must also pay its share of the cost of the airport. There can be no argument on the question that the public is justified in receiving a bill for the recreational values it receives from the airport. This may be collected via taxes, sightseeing turnstiles, concessions or a combination thereof. It is sometimes argued that the operators should pay sufficient to carry the transportation value share of the

cost on the premise that railroad stations are built at the expense of railroads. There is no such general recreational value to a railroad station as there is to an airport. It is also true that air transportation is in much the same stage of development today that the railroads were many years ago. At that time in railroad history they were given very direct subsidies by federal, state and local governments to persuade them to bring their new transportation agency to the various communities involved. It is interesting to note that after such subsidy the facilities resulting were under complete private control—and such recreational features as might be involved were maintained for private rather than public gain. The reverse is true insofar as airports are concerned, with almost no exception. If such cost were borne by the airlines, it would of necessity be included in the cost of air transportation and the small air traveling segment of the public would be paying for the whole community benefit. A proper landing fee basis, plus concessions and spectator charges should eventually provide sufficient revenue for the airport to meet its maintenance and operating costs, leaving only the debt amortization and interest to be carried on the tax roll or via other income producing media.

There is another type of airport capacity which is interesting and important. It is the question of how much aerial operation any one airport can accommodate, and is any given community going to be properly served and for how long by one, or will it need more than one airport? We have made a careful study of this under the able leadership of our Vice President, Ralph S. Damon, and it is our conclusion that no one airport, no matter how large or how well equipped and laid out and operated, should be expected to accommodate more than 200 airline schedules per day. This total has been estimated on the basis of an hourly capacity with the knowledge that in most fields there is at least one peak hour during which approximately 12½% of the daily schedules arrive and depart. We believe that the hourly capacity of an airport should be set at about twice the capacity of that airport to accept and discharge aircraft in time of instrument approach. We believe that improvements in instruments and technique and ground provisions, such as parallel runways, may make it possible to land and discharge an airplane every 2½ minutes, allowing 5 minute interval between each landing and sandwiching the takeoffs in between. This gives 24 operations an hour, which when doubled, results in 48 operations, or 24 schedules. This means that in times of instrument approach there will be a normal delay of approximately an hour on some of the aircraft scheduled during the peak hours. This delay will be less in other

than peak hours and will, of course, disappear completely in times of contact flight. It appears probable that civilian unscheduled operations will continue to be light in instrument weather, but the presence of military units on transport airports introduces new and unsolved traffic problems.

We have gone a bit further with this study and believe that in 1945 there will probably be about 250% of 1940's schedules in operation and that 1950 will see about 400% of 1940's schedules. We have further estimated that the average passenger loading of airline aircraft in 1945 will be 20 people, rather than the 15 current this year and that in 1950 the average airplane will be loaded with about 25 people.

New thinking is required on the design of terminal buildings to handle anything like 200 schedules a day. If we have 48 planes to service in an hour with 20 minutes at the ramp, we need a minimum of 16 loading positions or gates. Coverage should be provided for extra sections, holds, etc., perhaps to the extent of 50%. Such positions should be capable of handling the enlarged aircraft which are bound to come within the amortization period of the building. Assuming the Douglas DC-4 aircraft as average size for that period, we will need about 24 times 130 feet, or 3,120 feet of ramp. There will be nearly a ton of passenger baggage in a DC-4 and probably 3 tons and 120 passengers on the next large ship developed. These loads, plus the mail and other cargo, raise serious problems of traffic separation and handling. Passenger convenience and service efficiency alone make it inadvisable to have either a straight or arc ramp of such length. Some interesting solutions are being developed and should shortly be put into construction.

The application of the various figures estimated above to the present schedules of any given airport should come pretty close to developing the date at which scheduled airline operations alone will fill the capacity of that field or its terminal and require additional facilities, either for additional air transport operations or to handle unscheduled operations, or both. It is, therefore, sound for all communities to now take a measure of their aeronautic facilities and if it appears that the capacity of their present airport or its terminal building will be reached within a few years, a major study should be effected and a long-range plan built to provide the facilities, including ground communications, which will be needed as the years roll by. If such a plan is prepared and aviation grows more rapidly than is estimated, this can be determined by periodic checks and the timing on the program speeded up.

I know of no organization which can contribute as much to the solution of the many-sided problem of future needs as can the National Association of State Aviation Officials. Through your membership you have intimate and frequent contact, not only with airport managers of the United States, but with the other public officials and civic groups to whom such projects should appeal tremendously. I urge each of you to give careful thought to this whole problem and to continue to play your able part in its solution in order that our nation may have always available to it at its maximum effectiveness the keen-edged social, business and defense tool of aviation.