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## NATIONAL AIRPORT PROBLEMS\*

FRED L. SMITH†

It was quite a surprise to me to be asked to present a paper on airports for this meeting of the N.A.S.A.O. since for the past year I have been quite detached from airport promotion activity. In fact, I have had very little opportunity to do much flying except as a passenger. It has been rather interesting to me, however, to note that I have been gradually developing the mental processes of the passenger—and it may be, therefore, that my present reactions to the airport problem may be of some interest to my old friends among the state officials.

Aerial passengers, like the average motorist, pay little attention to the technical details which enter into the production or use of the transportation service available to them. The average motorist doesn't give a rap about how many headaches the production of his automobile has occasioned back in the research laboratory, the proving ground and the factory. He is, however, very keenly interested in the kind of service which his automobile gives him. You can depend upon even the most non-technical motorist to complain plenty if his automobile does not provide him with reliable, comfortable service without being in the repair shop half the time.

Aerial passengers are rapidly developing a similar attitude. They may not know—and probably don't care—how much of a landing run the ordinary airplane requires. But you can't kid them about the adequacy and safety of landing facilities when they have a chance to look out and see how closely a pilot grazes over surrounding obstructions!

During the recent national airport inspection tour under the auspices of the W. P. A. it was my privilege to go along as a representative of the National Aeronautic Association. Because of the fact that I had wangled an extended cross-country out of the Army in order to attend an Air Reserve Association convention at Oakland in September, I had landed in almost two-thirds of the airports visited on this tour, and already had a fairly definite personal opinion as to their adequacy. However, I was very much

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surprised to find how differently I felt toward many of these same fields as a passenger in an Army transport very similar to the commercial type Douglas known as the DC-2. I saw obstructions in the latter case which made practically no impression upon me as the pilot of any Army airplane of relatively good performance.

An interesting commentary on our inspection tour was that at times we had as many as ten pilots in the cabin. After listening to their comments and watching their reactions as a skilled Army pilot took us in and out of a number of these fields (and I suppose I was just as jittery as any of the rest) I would say that a motion picture, with sound effects, showing that group of pilots fidgeting around on a number of occasions, would have been the most potent argument for doing something to improve our terminal airports.

In making a report on my reactions to the airports visited on the tour, I purposely avoided any reference to data on the fields which were used, and tried to base my estimates of the landing areas on the impressions made upon me merely as a passenger.

My analysis, based upon the use of the Douglas DC-2, showed :

- (1) Only 7 of the 35 airports visited had adequate area, good approaches, and good surface development (judged, of course, according to the use which might be made of them by present-day aircraft).
- (2) Altogether 16, or approximately half, the airports had sufficient area in the landing field proper, but 9 were rated down because of poor approaches or inadequate surface development.
- (3) Expansion for the needs of larger aircraft seemed to be possible at 31 of the 35 sites visited, although it is admitted that the cost of property necessary for the expansion of several of the landing areas might be prohibitive.
- (4) Only 12 of the airports had approaches which might be considered "good"—indicating that the approach problem is just as serious in most cases as the adequacy of the landing area.
- (5) As to surface development, not one of the airports visited can be regarded as complete even for the present types of aircraft. The fact that I rated 16, or approximately half, of the airports as "good" in this respect, and only 4 as "poor," indicates that municipalities have made definite progress in developing their sites.

I realize that variations in the loading of the airplane and in the manner of approach and take-off have influenced my judgment of some of these landing areas. The fact remains, however, that air transport will be patronized by the American people only insofar as the reactions of the average passenger are favorable. He is not going to worry his head about runway lengths or number of miles of drain tile, any more than the average motorist concerns himself with piston displacement and the design of the combustion chamber. But if the passenger doesn't feel right about the airports, he won't ride—and if he doesn't ride, we won't have any civil air transport.

Consequently in considering the construction of airports it is just possible that we may have to add another factor which has been overlooked entirely in the past—and that is, the mental reactions of the average passenger. Airports which may be safe enough from the standpoint of operating technique will not be altogether satisfactory if our passengers, who are becoming more and more air-wise, feel uneasy about them.

While you gentlemen will have to depend upon experts of the Bureau of Air Commerce and of the Airport Division of W. P. A. for figures and data on airports, I would like to add to my remarks a few observations concerning some of the major airport problems which confront us today.

During the past year there has been a growing clamor for definite answers to five basic questions:

- (1) What area should be included in the landing field proper?
- (2) How many hard-surfaced runways should be provided?
- (3) What about the dimensions, materials and design of these runways?
- (4) Just what is the approach problem and how can it be satisfactorily solved?
- (5) How are future airport improvements to be financed?

When Major A. B. McMullen took over the Airport Section of the Federal Bureau of Air Commerce last spring he set about immediately to find the answer to one of the most urgent airport problems. Federal specifications for air transport fields had been talked of for a long time, but no definite requirements had been officially agreed upon. The answer to the first question may be decided after a complete study of the hundreds of tests conducted by Major McMullen's Section on the actual performances of airplanes on a large number of airports about the country. Without reference to any of this data, however, it seems quite safe to say

that airports of one square mile area at sea level will form the basis for a standard recommendation. Fields which are so designed as to afford equivalent runway lengths in sufficient number may possibly be as acceptable as those with an all-way area one mile square. Perhaps the proposed requirement of a square mile at sea level means a little more area than is necessary. Let's hope it does. It's about time to forget about bare minima for landing areas! As one airport engineer remarked, "Plenty of accidents have been attributable to the use of fields which were too small, but no one ever heard of an accident because the field was too large." A definite decision as to area should be accompanied by a firm resolve to insist upon performance requirements in the manufacture of new airplanes which will result in the fields being adequate for an indefinite period. In suggesting this point, everyone realizes that some reservations must be made. If vastly superior aircraft are built in the future which will require more room, there will be no other answer than to provide it.

The number of runways is one of the most perplexing problems yet to be solved. It is almost funny how the construction of only one runway has been rationalized in many instances. Seattle, Portland, Oakland—on the west coast—are to all intents and purposes one-runway fields. Why? Perhaps the local boys *know* differently, but they tell you that whenever they have any wind it is always up or down the strip of land which they are forced to call their local airport. No one would be rash enough to say that there simply aren't any places where a two-way field is all that is necessary. We have in the United States almost every conceivable kind of operating condition. Some deviation from standard requirements may be justified in many cases, but there must be some definite answer to the number of runways for scheduled operation on a year-'round basis at a majority of our terminals. Two-way fields are not the answer. However, what is it to be? Two runways? Three? Four? Five? Six or more? It was highly significant to me that on the airport tour Colonel Evans asked this very question of an airline executive, and he didn't even get an answer! The boys at Seattle, Portland and Oakland must have had their fingers crossed when they were championing their two-way fields, in view of the fact that all-way fields with four runways are now under construction at every one of these cities. The number of runways is basically important because it affects so definitely the final pattern of the area. Runways can be widened and lengthened, but they can't be picked up and laid down in a different direc-

tion. The problem really becomes a headache when an attempt is made to add runways to any layout which was not started with a definite idea of the appearance of the completed airport.

The answer to the third question—as to dimensions, materials, and design of runways—is probably much easier of attainment. Fortunately the experience of highway engineers has been of great assistance insofar as the materials and design are concerned, although the application of highway practice to airport runways may not be entirely satisfactory because of the great difference in the amount of traffic on highways and runways. The width of runways is already causing great concern because of its effect upon both drainage and lighting systems. The spacing of rows of lights 200 feet apart to mark off runways would seem to require the hard-surfacing of a full 200 feet. Certainly it does not seem logical to have any space included between the lights which might get the pilot into trouble if he got off line slightly.

The fourth question, dealing with the approaches, is really the most alarming one of all. Bad weather flying and the construction of larger airplanes have focused attention on this problem. Landing beams and robot landings may establish rather definitely the amount of clear space which must be provided along the glide path up to the edge of the airport. But even in good weather, the provision of clear approaches will always be a matter of primary concern. The erection of half a dozen ordinary dwellings at strategic points could make about half of our present terminals absolutely unsafe for even good weather operations. In other words, as the situation is at present investments of as much as five million dollars, in some cases, could be jeopardized by the expenditure of twenty or twenty-five thousand dollars. Some practical decision must be made as to what sort of an approach is necessary for safe operation and as to a method for keeping these approaches acceptably cleared of what might constitute serious obstructions. The way in which these approaches are to be controlled presents a knotty problem. On large landing areas there may be sufficient room within the boundaries of the field proper to provide a safe approach requiring only the usual residential zoning for a distance of a half mile or a mile beyond the boundaries of the airport, as is to be determined. However, with so many of our terminal airports actually below a safe minimum as to area, it is quite possible that municipalities may be obliged to do more than zone areas about their airports. In cases where the approach must be absolutely clear of any buildings, either the property along the approach must be purchased, or some

binding contract will have to be made with the owners of the property so as to restrict the use of such approach lanes to strictly agricultural purposes.

At any rate, the airport of the future is apt to assume a pattern quite unlike any of those which we now have. If the specifications for approach lanes do not include a large number of wide lanes, the airport of the future may be decidedly spidery looking. However, if a large number of wide approach lanes are necessary, we may be able to classify an airport as entirely satisfactory unless it includes a well-conditioned landing area in the center of a cleared space several miles in diameter. Or, in other words, we may have a five or six hundred acre airport surrounded by several thousand acres of ground either cleared or strictly zoned in order to make the landing area usable at all times.

This is essentially what the Airport Commission for the District of Columbia recommended, and it is perhaps the only satisfactory solution for terminal airports.

The financing problem is not a new one—certainly not to state aviation officials. It has become more acute, however, with the expansion of our airports and the necessity for large expenditures for hard-surfacing. It is interesting to note that the Federal Aviation Commission's recommendations, which were so well received at the time of their release, seem strangely out of date now insofar as airports are concerned. On page 113 of their Report appeared this statement:

"The cost of preparing a landing place for airplanes is almost entirely in land in most cases. \* \* \* Estimate by the Department of Commerce has indicated that the average distribution of airport investment assigns 52 per cent to land, 30 per cent to buildings and equipment, and only 18 per cent to surface preparation and drainage. If the Federal government were to help out only on the last item the help would scarcely be noticeable."

Perhaps we can infer from the last sentence quoted that they would have recommended federal participation in the cost of surface preparation and drainage, if it represented a more important percentage of the cost. Today these items represent the largest expenditures. It must be remembered, of course, that this estimate and the Report of the Federal Aviation Commission were prepared at a time when hard-surfaced runways and landing mats were regarded as nice things to have, but not as essentials. This statement is borne out by the fact that the War Department has profited very little by the airport construction program of the W. P. A. and other relief

agencies—more because they were the last to appreciate the utility of hard-surfaced runways than because of any reluctance on the part of administration authorities to allocate funds to Army air field projects.

Every municipal official who has had to handle an airport construction job has already discovered that the cost of land represents only a fraction of the total investment. Even where land costs as much as \$500 an acre, and even though the improvements are made by private contractors rather than through public relief agencies, the cost of these improvements on the average is always two or three times as much as the cost of the land. The construction of hard-surfaced runways and the complete drainage systems which must accompany them has made a world of difference. Grading operations are so much more extensive if the runways are to be suitable. There is as much difference between the approved airport of 1930 and what we now consider necessary, as there is between the old secondary roads in our highway systems following contours and laid out with a minimum of surface preparation, and our more modern highways from which curves have been eliminated and along which hills have been cut and gullies filled.

As city officials have listened to the pleas for more carefully prepared landing areas and the immediate need for costly hard-surfaced runways, they have begun to raise a concerted cry for a proper sharing of the cost by the federal government. They realize, now, that the improvements they have been financing have a distinctly federal value although the only participation of the federal government in financing has come about quite by chance through the unemployment programs. They have been shown the possibilities of federal aid and are going to insist upon a sharing of the cost of further improvements.

At the recent National Conference of Mayors held in Washington the importance of this subject was shown by the fact that one whole afternoon of the two and a half day conference was spent on airports exclusively. Without exception mayors from all over the country (including the mayor of almost every large city) entered the discussion. A very strong resolution calling upon the federal government for recognition of this problem and the development of a nationwide plan for airport financing was adopted.

The same idea inspired the introduction in Congress of a bill (H. R. 6972) by Mr. Dingell of Michigan "to authorize the Federal Government to share with the various States, counties, and municipalities, and other political subdivisions of the States and Terri-



tories and possessions of the United States the cost of constructing and improving airports." This legislation or something basically similar should be given every encouragement.

When the Bureau announces its requirements for airports, state officials and friends of aviation in every walk of life should back the program one hundred per cent. It is going to take great intestinal fortitude to hold out against the hue and cry which will be raised in a number of quarters by individuals or groups whose airports will never be able to meet the new standards. Naturally the owners of a few private airports now used for transport operations will pull every wire at their command to prevent the closing of, or any restriction upon the use of, their landing areas. Even some of the airlines may wail, if the requirements limit their operations at any points where they are doing much business. Municipalities will naturally object strenuously to having their landing areas rated down.

In spite of all this clamor, we must never lose sight of the fact that the public safety is our greatest responsibility. There must be no compromise on safety, and there must be no qualification of these requirements because of political expediency. The approval of smaller fields or shorter runways where a professional analysis of the particular situation warrants such an exception may be quite in order. But if either federal or state aviation technicians give their tacit approval or sit idly by while their fellow workers approve the use of fields which cannot meet the requirements of present-day transports, they will have shown themselves to be unworthy of the trust which has been placed in them by the American people.

You aviation officials are very fortunate to be serving at a time when your efforts can be so productive of an exceptionally fine contribution to our national welfare. The solution of our airport problems should be your greatest concern. Accept the challenge, and fight everlastingly for adequate airports—the greatest and most immediate need of American aviation!