

Military Highways

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To my desk in Washington there come more or less directly a goodly number of the letters and telegrams in which American citizens tell their Government what to do about our highways to fit them best to serve the needs of national defense. Unlike Dr. Gallup, I am not prepared to say that these expressions make up a representative sample of American opinion, nor have I troubled to make a careful compilation of them. But taking them as they come, I think it would be fair to say that the suggestions offered would classify most prominently under two heads.

The first would be the class in which it is the common thought that the national defense would be best served by building an elaborate system of long-distance highways somewhat after the model of the German autobahnen. Build as quickly as possible a more or less extensive system of such superhighways, say these advisers; put all the road-improvement eggs into that basket, and for the time being forget the lesser roads. In that way we shall serve best the most important necessity of the new mechanized warfare, which is that our defensive forces of men and motorized artillery and tanks shall be able to speed from coast to coast and border to border and so repel the enemy at whatever point he may seek to attack, by "getting there fastest with the mostest men." In some such terms it would be fair to paraphrase one of these largest classes of suggestions offered. Without injustice

to the authors of these suggestions it would be possible to add also that, while individually they differ considerably in respect to the location of the super-routes they deem most important, they agree generally on the point that at least one of the routes proposed should pass through or near each individual's home town.

The second of the two largest classes is composed of many suggestions, widely variant in their detail, but commonly proposing some one particular highway as very important to the national defense and, therefore, requiring substantial improvement. It can not be said with certainty that the number of suggestions of this class is inferior to the number of those offering a superhighway system for consideration. Its second mention, therefore, has no particular significance; and its essential difference from the first class of suggestions is that the individual proposals of which it is made up offer no general solution of defense highway needs of the entire country, but confine themselves rather to the needs of one locality. They have in common with suggestions of the first class the characteristic that the locality of each correspondent's residence would not fail of benefit if his suggestion were adopted. The suggestions of this second class that we have thus far received are not, I am sure, sufficiently numerous to include all the roads of the United States, but it may be inferred that they approach the total mileage as a limit and require only time to reach the limit.

Into one or the other of these two classes it would be possible, I believe, to bracket most of the suggestions contained in letters and telegrams from persons resident in all parts of the United States, that have come to the Public Roads Administration during the last twelve months. Perhaps we may consider them, therefore, to be representative of the two main avenues of approach which our people would take to an eventual provision of highway facilities adequate for the national defense. The two approaches differ essentially in this: that whereas one would concentrate the principal effort upon construction of a few continent-spanning routes ideally uniform in design and capacity, the other would spread the same effort over many local sections of highway where improvement is known or thought to be needed, raising each selected section to a high standard of design.

Of the two, I will say at once that I prefer the plan that would apply whatever effort it is possible to put forth immediately to the local situations where improvement is found to be particularly necessary. But, before going into the reasons for that preference, suppose we think for a moment of the ways in which our own highway system might be called upon to serve the national defense, and try, if we can, to discover what differences there may be between the defense uses of highways in the United States and in the warring countries of Europe.

In the first place we have to remember that the United States is not Germany. It is not a relatively small territory, surrounded on all sides by potential enemy territories. Unlike Germany we do not have to prepare to resist a mass invasion that might come upon us at any or every point of our borders, suddenly and almost without herald. Unlike

Germany we do not plot quickly to mass our own military forces to overleap our land borders in attack upon our neighbors. Our first line of defense does not run with these land borders to which we require at many points avenues of approach from all parts of our country for the supply of armies either standing at defense or pushing outward in attack. On the contrary, our first line of defense lies far at sea. It is our strategy to meet any probable enemy along those far-flung ocean lines; and the probability of attack in force across our land borders or on our own soil may safely be regarded as remote.

Again, unlike Germany and others of the warring European lands, the population of our country is not distributed in nearly uniform density over our entire territory; and our important military objectives are not similarly distributed throughout our land. On the contrary, we have many and vast wide-open spaces in which there is no objective that an enemy would deem worthy of attack.

And once again, unlike Germany and the nations of Europe, our motor vehicles are not the possessions of a wealthy few, but of well-nigh every family in our land. In the event of war, our supply of motor fuel would not be so short as to compel the prohibition of civilian use. On the contrary, it would be our great advantage that the tempo of civilian activities so necessary for the support of the armed forces at the front could continue at the high speed permitted by widespread ownership and use of motor vehicles.

And, finally, our situation differs materially from the situation of Germany in this: that we have hundreds of thousands of miles of ordinary roads, recently built, that are usable and

regularly used with reasonable facility by millions of motor vehicles; whereas the age-old landstrasse of Germany, and the like ordinary roads of other European countries, with their narrow surfaces, sharp angles, and frequent passage through close clustering hamlets, could not conceivably serve a similar usage with any comparable facility.

These differences between the United States and European countries suggest that whatever may be the military and defensive uses of roads in Europe, and however these uses may condition the design and location of roads on that Continent, we would err seriously were we blindly to pattern our defense road program after any European model. If those are correct who see only military and warlike motives in the conception and construction of the German autobahnen, the strategic purposes that such a system in Germany would be intended to serve are still so dissimilar to any strategic objectives of the United States that it would be wholly unreasonable to assume that an imitation of the German superhighway system would equally serve our purposes. For my own part, I incline to accept at their face value the protestations of German road authorities that their excellent, but far from extensive modern highways were designed mainly for more pacific purposes - to give work and bread to idle men, to invite an income-producing foreign tourist travel, and to supply the

basic condition upon which it would be possible to build a national motor vehicle industry. I am the more inclined to accept this view when I recall how effectively these direct and highly conspicuous arteries, passing from one important center to another can be used to guide hostile air attack to its important objectives, and how easily their effective use as highways could be embarrassed by bombing of the long and high viaducts that have been preferred to more prosaic earth fills at many points. In these architecturally striking structures and in the striving for beauty that is manifest in the landscape setting of these great highways of the German Reich, I believe we see, not the scheming of a coolly calculating war lord, but rather the vanity of an all powerful dictator with a certain taste for beauty, seeking a lasting memorial of his greatness.

In war or peace, we of the United States have uses for our highways that have nothing whatever to do with the vainglory of a dictator, and it is such direct and practical uses that we should keep in the forefront of our thinking as we consider what should be done, with a defensive purpose, toward the further improvement of our roads.

It has already been suggested that combat on our own soil and the massing of great armies on our land borders are conditions that we need not regard as probable. If they were far more probable than they are, it might be pointed out that our greater security would lie in the possession of many moderately improved roads, supplying a choice of routes for alternative or simultaneous use, rather than in dependence upon fewer single, highly developed, and conspicuous connections, which would tend toward a narrow channelization of movement and greater hazard of obstruction, so that, even were we expecting the near contingency of combat within our borders, construction of a few trans-continental superhighways would constitute a preparation of doubtful strategic value. This is a lesson that the Italians in Libya have doubtless learned by now to their sorrow.

But, if the planning of our highways is not to contemplate their use for purposes of combat, what then are the defense purposes to which our plans should be directed? Stripped of all fanciful imagining and mysterious suggestion I think these purposes can be boiled down to a very simple statement, as follows:

1. To facilitate the mobilization and training of greatly enlarged military and naval forces.
2. To facilitate transportation of the raw and finished products of a vast industrial machine greatly speeded and geared for war.

Simple and brief as it is, I believe that to be a practically complete statement of the general purposes of a program of highway improvement to serve the needs of national defense in the United States. But, if the statement of purposes is simple, decisions as to what particular measures will best obtain the ends sought may not be so easily reached. To form these decisions it is necessary to have a very definite comprehension of the present condition of our road system and a clear conception of the particular uses to which it is likely to be put by the manifold activities incident to the preparation for war.

As to the condition of the roads, much that is currently said and written on the subject tends to magnify the effects of their undoubted deficiencies in respect to their ability to serve in the present emergency. Whatever its defects, it is well to remember that we have a highway system in this country that is in daily use by far the largest number of motor vehicles to be found in any country of the world - vehicles that roll up a total of 275 billion miles of travel annually, and do that without serious hindrance by road conditions. A road system capable of such use cannot be rated as alarmingly inadequate, and it can be said at once that there is in fact no alarming inadequacy.

Thanks to the planning surveys we have today a more exact knowledge of the condition of our entire road network and of the normal usage of all its parts than we have ever had before. The special studies of the State highway departments and the Public Roads Administration during the last twelve months have determined as well as such a reconnaissance can the location of the more critical deficiencies in relation to an acceptable service of expected defense usage; and the results are not seriously disconcerting.

As to the particular road uses that may be expected to result from the defense program, it is desirable first to repeat - what has been said many times before - that there is no purely military vehicle or equipment that requires stronger road surfaces or bridges than are required by vehicles in normal civil use.

With the exception of the medium and heavy tanks and a fuel servicing truck and trailer of the Air Corps, the normal gross loads of military vehicles fall well within the maximum weights of commercial vehicles. The maximum axle load of wheeled equipment - that of the 155 mm gun carriage - is 18,000 pounds, and the heaviest of other classes of vehicles carry normal axle loads nearly 5,000 pounds lighter - approximately 13,000 pounds. Conforming to its long established policy the Army has kept the weights and dimensions of the great majority of its vehicles substantially below the corresponding weights and dimensions of commercial vehicles.

The projected 55-ton tank - heaviest of all military units thus far designed - is the outstanding exception to this policy, and even these

heaviest units impose no extraordinary demand upon road surfaces and can safely be passed over bridges designed for the standard H-15 loading, if operated in a single file along the center line of the bridges, with separating intervals of not less than 50 feet, and with speed reduced to 4 miles per hour.

The most extraordinary condition of road usage associated with purely military traffic is the movement of numerous units in trains or convoys. Every effort is made to maintain separating intervals between vehicles of the convoys that will permit the operators of civilian vehicles to cut in and out in passing on 2-lane roads. But such efforts are not invariably successful. Moreover it is necessary to halt the convoys at times for various reasons, and when such a halt becomes necessary, the standing convoy becomes an obstruction to moving traffic unless there are shoulders sufficiently wide to accommodate the convoy vehicles entirely outside the traveled way. The lack of shoulders of such width constitutes a definite deficiency on roads likely to be used with some frequency by convoy movements.

A large convoy, moving over a single road, stretches out for miles and hours between the first and last vehicles. If the convoy can be broken into several columns, each taking a different road between the morning and evening camps, the length of any one road occupied and the time spread in arrival of all units at the end of the day's march, can be materially shortened. To gain these advantages it would be essential to have conveniently usable auxiliary roads approximately paralleling the main lines of important convoy movements.

With a greatly enlarged, and a newly mechanized and motorized army in active training for war, it is to be expected that we shall see in the immediate future very much more of the army on the roads than we have in the past. There will be practice marches; there will be more or less frequent maneuvers and war games and there will be a constant movement in and out of, and perhaps between the posts that are being established in all parts of the country. Many of these posts will grow during this year from relatively small establishments, manned by a skeleton garrison, into the equivalent of cities of substantial size - cities of from 20 to 70 thousand inhabitants, and inhabitants whose daily business, the new business of mechanized warfare, will require them to make a more or less constant use of the roads.

If, therefore, we are unlikely, in any near future, to engage in actual warfare within the United States, as we can safely assume, it is equally safe to conclude that we shall engage, and that very promptly, in a good deal of simulated warfare; and this, so far as the purely military use of roads is concerned, is what we have to prepare for.

But purely military uses, considerable though they may be, are certain to be the least of the new and expanded uses that will be made of our highway system as a result of the defense program.

The modern style in warfare is described as total war; and that appellation is particularly significant of the impact of the new warfare upon the industries of the countries that engage in it or prepare actively for it. It reaches, it augments and intensifies virtually every industrial process; and immediately and tremendously it affects all transportation services. It is this intensification of all industrial transportation, rather than the less critical, purely military movement, that will put our highway system to its most difficult test. And not just a few roads, but a very substantial part of our total road system will have to meet that test. It is such a view of the probable usage of roads consequent upon the great defense program upon which we are entering that inclines me to a rather respectful acceptance of claims of the defense importance of many local sections of highway, here, there, and everywhere throughout the country; and to reject as less realistic the many more spectacular proposals that are put forward for the construction of great country-spanning superhighways.

But if, according to this view, a very substantial portion of our highway system will be entitled to wear the badge of defense service, it does not follow that every road that wears that badge is in need of immediate improvement. In recent years we have become rather acutely conscious of the defects of our roadways. We have emphasized the prevalence of a need for modernization. We have hoped especially to find ways for the correction of these most serious inadequacies and bottlenecks that exist in and near the cities. But, I respectfully suggest, that this is not the time, and this emergency that now confronts us is not the occasion to launch a general program of road and street modernization.

I have cited the vast total of our annual vehicle mileage as proof that we now have a road system that, with all its faults, is still ready to yield a tremendous service, just as it is. Nevertheless, there are places at which it is least ready to serve; there are sections that will be subjected to a new usage so far different from any for which they have been designed that they must be rebuilt; there are critical weaknesses that must be repaired. The proper task of this moment is to seek out these greatest deficiencies and correct them. The objective of what we now do should be not what is ultimately desirable but what is now most urgently and absolutely required. In doing this we shall find a task that will tax our strongest effort, but we shall thereby make our best and most useful contribution to the general program of defense.

It is such a view of the important highway needs of the defense program that has been taken in preparation of the report of the Public Roads Administration that was submitted to the President a few days ago.

After the improvement or outright construction of some 1,500 miles of roads and streets within military and naval reservations - a work that is already well in hand - the report lists as the most urgent of all needed highway undertakings the provision of satisfactory access to nearly 200 reservations and a large and increasing number of key industrial sites. In connection with the reservations only, the needs of this character thus far charted involve more than 2,800 miles of road and an estimated expenditure of \$220,000,000. These indicated needs are growing from day to day as the defense program matures, and this growth and the addition of improvements required for the service of industrial sites may easily double the cost mentioned in a short time.

With the helpful cooperation of the State highway departments, and by the fullest possible application of the various presently available Federal funds, provision has already been made to meet a substantial part of this need. It is generally agreed that the responsibility for these improvements rests heavily upon the Federal Government, since the traffic occasioning them is predominantly a military movement; and the report recommends an immediate appropriation of not less than 150 million dollars to pay all costs of the improvements including the acquisition of rights of way.

As a fund to be used for the construction of roads that will be repeatedly used in tactical maneuvers of the Army and for reimbursement of the costs ~~whenever~~ incurred by States and local governments for the repair of roads occasionally used in such maneuvers and war games, the appropriation of 25 million dollars is recommended. The roads that will be so used, described in the report as "tactical" roads, are of three classes.

1. A relatively small mileage of roads connecting with more or less isolated strategical points. Traffic on these roads will be almost exclusively military.
2. Certain roads in the immediate vicinity of military reservations, other than access roads and routes of the strategic network, which by reason of their proximity are likely to be frequently used in tactical maneuvers of local range.

3. Roads of similar character in areas selected as theaters of war games - areas that may not be near established reservations.

For the essential improvements and repairs of these tactical roads, as for the access and reservation roads previously mentioned, the report recognizes a peculiar responsibility of the Federal Government arising from the fact that the usage to be served is predominantly military.

Beyond these ~~various~~ classes of roads of peculiar and very practical military significance, the roads of principal importance for service of the more general transportation requirements of the defense program are grouped in what has been called the strategic network - a system of approximately 75,000 miles reaching to all parts of the country. In every section, these roads have been selected as those of maximum usefulness. From section to section they constitute the principal connections. They embrace all the roads that were included in the system of interregional routes recommended in the report "Toll Roads and Free Roads" and an additional 45,000 miles of the country's most important highways.

On these roads the surveys made by the Public Roads Administration and the State highway departments disclose the existence of more than 2,400 bridges of load capacity inferior to the H-15 loading standard, more than 5,000 miles of pavements or surfaces less than 18 feet wide, and approximately 14,000 miles of surface incapable of supporting in all weather wheel loads of 9,000 pounds carried on low-pressure pneumatic tires. These are the most serious deficiencies. The report estimates that they could be eliminated and the rural main lines of the network could thus be put into acceptable condition for emergency use with a minimum expenditure of approximately \$458,000,000.

Less critical deficiencies of the rural network consist of a large number of bridges of inadequate horizontal clearance, and a smaller number of deficient vertical clearance; a very substantial

mileage of roads the surfaces of which, though wider than the critical minimum of 15 feet, are still narrower than they should be for proper accommodation of the present and expected traffic volumes; a common condition of excessive curvature and inadequate sight distance; and a general lack of shoulders of sufficient width to accommodate standing vehicles without obstruction of moving traffic.

To raise the entire rural network of main lines to the standard eventually desirable for thoroughly safe and convenient use by both civil and military traffic, and provide further for the expensive improvements required on portions of the main lines within the corporate limits of cities, and for the essential improvement of auxiliary lines of rural roads, approximately paralleling the main lines, would require a continuing expenditure as large as the minimum estimated, for a period of several years.

In recognition of the Federal Government's share of responsibility for the improvements immediately required, the report recommends a Federal appropriation of not less than 100 million dollars, to be prorated to the States on the existing Federal-aid basis, and used solely for designated defense projects. This appropriation, the report adds, should be available to pay all legitimate costs of the projects on a somewhat higher basis of Federal participation than the existing 50-50 basis.

By these recommended provisions the report proposes to deal with the more urgent highway improvements required by the defense program.

It repeats and emphasizes the arguments fully set forth in the report on "Toll Roads and Free Roads", for an eventual thoroughly adequate improvement of the main arteries of highway transportation, with special attention to those most serious needs that exist in and near the cities. And, what in the long run may prove to be its most important recommendation is one that proposes the appropriation of 12 million dollars to be used, when matched with State funds, for the making of engineering surveys and plans for important improvements of this character to be carried out after the present emergency passes, as part of a program of construction of useful and vitally needed public works that it will then be desirable to undertake to help sustain a high level of industrial activity during the period of transition back to an economy of peace.