

many of the roads which were adequately designed from ten to twenty years ago are now more or less outmoded and obsolete as a result of the increase in numbers and the perfection of the motor car itself.

All of this is extremely important from a commercial standpoint, but it likewise has developed the absolute and essential need for highways in any military operation, whether it be in the form of a preparedness program or engagements in actual war.

## MILITARY DEMANDS ON OUR HIGHWAYS

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The War Department, in collaboration with the Public Roads Administration, has under continuing study the question of highways and national defense. Certain general principles are mutually agreed upon by the War Department and the Public Roads Administration as follows:

First, that the highways which must be constructed for commerce and national development will be identical, in general, with those required for military purposes.

Second, that the location of highways and the priorities of construction are matters for determination by the Public Roads Administration and the State Highway authorities concerned. This being the case, the War Department refrains from recommending specific highway routes except in the most critical circumstances.

Third, that a general network of good roads connecting important supply depots and mobilization and industrial centers, has more strategic value than transcontinental roads which merely cross the country from coast to coast or from north to south. In this connection, a system of high-standard roads connecting our principal centers of production with vital strategic areas has considerable commercial, as well as military, value.

Fourth, that the War Department's primary interest is to insure adequate highway facilities between important strategic points and vital areas.

The results of such studies are furnished by the War Department to the Public Roads Administration and I believe to your state highway departments in the form of Special Highway Maps which show highways of military importance. It should be noted that there are no military roads, as such, in the United States. Instead, the primary purpose of the Special

Highway Map is to provide your state highway departments and the Public Roads Administration with information concerning important strategic roads. It is hoped, in the interest of national defense, that the general routes indicated and the standards of construction desired will receive favorable consideration in your highway development program.

The War Department also indicates the standards of construction which are desirable from a military standpoint, as follows:

Surface—Hard surface, capable of supporting 9,000-pound wheel load on pneumatic tires.

Width—Minimum of 20 feet. Bridges to be four feet in excess of approach roads.

Bridge Load Capacity—Minimum H-15 loading.

Grade—Non-mountainous areas, maximum of 5 per cent in lengths greater than 500 feet; mountainous areas, maximum of 8 per cent in lengths greater than 500 feet.

Curvature—Non-mountainous areas, maximum of 6 degrees; mountainous areas, maximum of 14 degrees.

Vertical clearance—Minimum of 14 feet.

Sight Distance—Non-mountainous areas, minimum of 1,000 feet; mountainous areas, minimum of 650 feet.

War Department agencies responsible for the design of military vehicles give full consideration to the limitations on weight, height, and wheel load imposed by the foregoing standards.

The co-operation of the local communities of the states and of the Public Roads Administration already has provided many essential high-standard strategic roads in most sections of the United States. These highways would be of inestimable value in the event of a national emergency. However, some sections of this strategic system still need improvement. The Public Roads Administration, at the request of the President, conducted a survey to determine the adequacy of highways for national defense. The results of the survey indicated that approximately 2,000 bridges on main traffic routes are below the minimum standards required; that between 4,000 and 5,000 miles require resurfacing and widening; that, in general, the shoulders are too narrow, and that underpass clearances in hundred of cases are less than the minimum desired.

As outlined by Professor Petty, the War Department collaboration with the Public Roads Administration and the Highway Transport Committee of the Association of State Highway Officials considers the following in addition to the strategic highway projects.

a. Highway requirements in the neighborhood of military posts and garrisons, especially in the vicinity of mobilization centers and

b. The highways necessary to serve traffic requirements in important war-time industrial areas.

For convenience, roads which are needed in the vicinity of military posts and concentration centers are called access roads. In many instances these are inadequate in number and far below the standards that are needed. As a rule they are comparatively short in length and inexpensive to construct. Their construction not only would facilitate troop training but also would diminish traffic hazards in congested training centers. The War Department recommends that the state highway authorities and the Public Roads Administration give consideration to the construction of these essential access roads.

With respect to highway facilities in important industrial areas, the War Department has informed the Public Roads Administration concerning the probable industrial load which it estimates will be generated by wartime procurement. This, translated into the probable increase in highway traffic, should provide you with information for use in connection with highway-development programs in those areas.

To summarize, from the military viewpoint:

First, existing deficiencies in the strategic system should be eliminated.

Second, projects for the construction of essential access roads deserve favorable consideration.

Third, highway facilities in important industrial areas should be adequate to meet the highway-traffic requirements of wartime industrial procurement.

The Federal Highway Act of 1940, which authorizes the Commissioner of Public Roads to give priority to and to expedite projects for national defense, provides a sound basis for accelerating the construction of access and strategic roads. It is recognized, however, that the attainment of our objectives, with respect to highway development, will span a period of several years at the present rate of progress.

## ACCOMPLISHMENTS OF THE PAST FOUR YEARS

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We in Indiana have prided ourselves upon the progress that we have made in the development of our road system and upon the sound financial policies that provide funds for the further development and maintenance of this motor transportation system. We have been, and we are today, fully justified in that pride.