

The National Highway Program

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Highway transportation today is one of the most vital elements of the American economy. It brings together, when and where there is work to be done, the people, the materials, the machines and the resources to build the things we need. It helps, through the growth of its own facilities, to keep the economy prosperous and growing.

Through the years, aided and abetted, of course, by the need to win World War II, and in the face of almost unbelievable increases in traffic, we have fallen far behind in meeting our highway needs, both at the state level and on a nation-wide basis. Traffic congestion is taking its toll on our economy, not only because of traffic delays but because of the alarming accident rate which causes tragic loss of life, personal injury, and property damage.

Congress, in 1956, took steps aimed to correct this condition. It enacted a Federal Aid Highway Act which made provisions for completing our interstate system of highways. It also provided for additional aid to modernize and expand secondary routes and urban extensions in the various states and for roads and trails in specific national areas.

The program, as enacted, was aimed at meeting most of our road needs. It was met on all sides with general enthusiasm. At long last, it seemed, we had a sound, long-range, balanced, accelerated highway program. The size of the task ahead was recognized and everyone moved with vigor and enthusiasm to accomplish it.

INTERSTATE HIGHWAY SYSTEM

My remarks today will deal primarily with the interstate phase of this highway program. In the 1956 highway act, Congress, for the first time, actually committed itself to build a designated system of national highways. Always in the past, appropriations for highways have been approved on a two- or three-year basis. Then, the next Congress each time has reconsidered what the appropriation should be.

This time, however, the act not only set up a specific program, it also authorized funds to build a 40,000-mile national system of inter-

state and defense highways. These national highways, commonly called the interstate system, unquestionably form the most important network in the United States.

The interstate system is nation-wide in coverage. It includes the roads of greatest significance to our peacetime economy and to our national defense. It passes through all 48 states, joins 90 per cent of all cities of 50,000 population or over, and connects 42 of the state capitals. When completed, this system will probably carry at least 25 per cent of our traffic.

The long-range goals of this program are to interconnect commercial and industrial centers from coast to coast, to serve the multiple needs of highway users in thousands of communities adjacent to the new expressways, and to bring town and country closer together. Also, through foresightedness of its planners, the act makes every effort to avoid mistakes of years past by providing that geometric and construction standards of these national highways shall be adequate to accommodate the types and volumes of traffic demands of 1975.

For discussion purposes let's break the bill down into two phases—standards and financing. Then let's direct our attention first to the standards.

STANDARDS

As a result of this act, the states for the first time in our history are cooperating to build a connected system of highways. Also, for the first time these connected highways are designed to carry traffic as far into the future as 1975. Naturally the standards used will have an effect on all highways built, both on and off the interstate system.

Standards fixed for these interstate routes are the highest yet prescribed for freeways in this nation. They have been set up by the design and planning committee of the American Association of State Highway Officials, approved by the Association's Executive Committee, and finally ratified by representatives of each state highway department at a meeting held in July 1956. They then were formally approved by the Secretary of Commerce, as required by law.

Thus, these standards by which we are building our state highways today are not standards set up solely by the Bureau of Public Roads but by the State Highway Departments, acting through committees of the American Association of State Highway Officials.

It has been definitely established that highway traffic interruptions cause accidents and economic loss. With that thought in mind, the standards adopted have been planned to provide safe, efficient, and

economic transportation without interruption. Every known feature of safety and utility is to be incorporated in design. When the interstate system is completed it will be a credit to our nation.

Probably 75 per cent of this interstate or national system of highways will be built on new locations because of the high standards required. This will result largely from the fact that, among other things, the standards require that control of access be engineered into the highways. Usually it is not economically feasible to buy the right of ways required on existing routes because of developments adjacent thereto.

Frequently, reaction of the public to moving the highway from an old location to a new one brings objections, especially when by-passes are built at towns and cities. Actually these new locations serve as relief routes, taking unnecessary through-traffic away from congested business streets, freeing them for traffic of a more profitable nature. As a result, they benefit, rather than harm, the communities.

We have a convincing example of that in Missouri, in an economic study completed only recently on effects of a controlled access U. S. route 66 (Interstate 44) by-pass at Rolla in south central Missouri. That study, which covered the period two years before and two years after the by-pass was built, revealed that construction of the by-pass definitely had a favorable impact on the city's over-all economy and actually saved lives in the affected area.

That study revealed that retail sales in Rolla and in Phelps county, of which Rolla is the county seat, made a continuous and rapid growth from 1953 through 1956, the survey period. That increase was even more rapid than for the state as a whole, which would indicate the by-pass made a contribution both to business growth of the city and to area economy.

Favorable effect of the by-pass on business along the old highway also was most significant. While retail sales in both Rolla and Phelps counties were showing increases, sales started down in 1954 for businesses on the old route. In 1955, the first year after it was built, sales took a decided upturn, then levelled off slightly lower in 1956, but still substantially higher than for either 1953 or 1954.

Five fewer traffic deaths were recorded on the combined highway routes in 1955-56 than in 1953-54, to give proof of increased safety obtained by diverting through-traffic and relieving congestion of the old route. Material decreases also were recorded in the number of accidents, number of injuries, and in property damage.

Standards for this national highway system also require that the great majority of the mileage be constructed by dividing the lanes of

traffic in opposite directions. They will be separated by 36-foot wide median strips in rural areas and at least 16-foot wide medians in urban and mountainous areas. This dual lane construction and access control are recognized today as the two greatest engineering features in highway safety.

Traffic lanes must be at least 12 feet wide. Where hourly average traffic in 1975 will be 700 or more vehicles, the highway must be four lanes divided. For lower volumes it shall be two lanes but so designed and located on right of way that an additional two-lane pavement can be added later to form a divided highway.

Other standards provide that there be no railroad grade crossings on the freeways. Highway crossings at grade will be eliminated except in rare instances in isolated areas. When the system is completed, the highway user will be able to cross the country without being stopped by a red light or a stop sign!

Elimination of highway crossings at grade will be achieved by the use of various type interchanges. In the main they will be of either trumpet, diamond, or cloverleaf design.

A trumpet interchange might be constructed where a state highway or local road joins but does not cross the interstate route. This type of structure will enable highway users to get on or off the interstate route without crossing a high-speed traffic lane and without interfering with the normal flow of traffic on either route.

The diamond type interchange may be built in either rural or urban areas where a minor highway crosses the interstate route. It provides for the free flow of traffic in all directions and allows the traffic to merge into the main artery with safety. The diamond interchange has four ramps for channeling traffic on and off an interstate highway and will be used where the minor route carries a considerably less traffic than the main artery.

The cloverleaf intersection will be constructed at points where other state highways and major local roads intersect and cross the interstate routes, and where the volume of traffic is heavy and more nearly equal on the intersecting routes. By using the proper lane or ramp, motorists will be able to take any route they desire without crossing any conflicting lane of traffic.

The standards fix design speed of all highways in the interstate system at least 70, 60, and 50 miles per hour for flat, rolling, and mountainous topography respectively, and depending upon terrain and development. For design speeds of 70, 60, and 50 miles per hour, gradients generally shall not be steeper than three, four, and five per cent respec-

tively. Gradients two per cent steeper may be provided in rugged terrain.

The standards require that clear height of all structures shall not be less than 14 feet over the entire roadway width, including the usable width of shoulders. It also is recommended that allowance be made for future resurfacing in this clearance. Also, the width of all bridges of 150-feet or less between abutments or end supporting piers, including grade separation structures, must equal the full roadway width on approaches, including usable width of shoulders.

FINANCING

So much for standards. Let's direct our attention now to financing, including original provisions of the bill, that threat now of curtailed funds that could hamstring, or at least stretch out, the program, and the efforts being made in Congress to meet that threat.

In the matter of financing, the bill lends itself well to interpretation. Title I indicates that the interstate system program shall be financed by specific appropriations in 13 years and so sets out those authorizations, based upon cost estimates adequate to complete 40,000 of the 41,000-mile system.

Appropriations authorized by the act for the national or interstate highways totaled \$24,825,000,000. This authorization is comprised of annual allotments ranging from \$1 billion for the first year to a top annual amount of \$2.2 billions, to be reached the first time in fiscal 1960.

Title II of the act set up a highway trust fund to operate through 1972 to finance the authorized interstate construction, plus construction on other systems which it contemplated would be authorized subsequent to 1959. It transferred certain highway user funds from the general fund to the trust fund and levied new highway user type taxes and earmarked them for the trust fund. It also included the Byrd amendment, which prohibits the Department of Commerce from making any expenditures from the trust fund that would exceed any amount in the fund.

The act provides that cost of the interstate system routes will be paid generally by 90 per cent Federal aid and 10 per cent state funds. Aid during the first three years of the program was to be distributed to the states on a basis of two-thirds population, one-sixth on areas and one-sixth on total post road mileage within a state.

For the remaining ten years of the program the funds are to be distributed on a basis of need, with that need to be determined on

estimates of cost compiled from studies and reports to be made at stated intervals. The first such estimate was presented to Congress earlier this year and is now before the proper committees for consideration and study.

Apportionments for 1957-'58-'59 on the interstate system all have been made on the basis as prescribed in the 1956 act—\$1 billion, \$1.7 billions, and \$2 billions respectively. Now, however, real cause for worry has arisen over what is the answer for 1960 through 1969. Several barriers need to be removed if the program is to go ahead on schedule.

Experience has shown that the act did not provide funds for the trust fund at the authorization rate in Title I. Thus, because of the cash-basis requirements the Federal Highway Administrator has reported he will have to delay the 1960 apportionments until December 1958 because of a lack of cash in the fund. He also has indicated he will have to reduce the 1960, '61 and '62 apportionments from \$2.2 billions each year to \$1.6, \$1.2 and \$1.4 billions, respectively.

Also, the new cost estimates place cost of completing the system at about 37 per cent above that of the estimates upon which the legislation was built. Indications now are that it will cost at least \$37 billions instead of \$27 billions to construct the original 40,000-mile national system. This does not include the 1,000 miles added to the system by the 1956 act. When those are included the probable total cost will be about \$40 billions.

Perhaps here we should explain that this estimate of cost was compiled by the Bureau of Public Roads and the American Association of State Highway Officials, acting through its member states. I can assure you that the association and its members feel that the estimate is the most accurate that could be made.

To obtain an accurate estimate applicable to the entire system, it was recognized that use by all states of a uniform system of computing costs would be necessary. With this in mind early in 1956, personnel of the Bureau of Public Roads began compiling a manual of instructions. Then, in August, State Highway Departments met the Bureau Officials of the three regions in which these states are located. They reviewed and discussed the manual in detail.

With minor revisions it was approved. Before it was submitted for general use it was given a trial run by the three state departments, where it was used for test studies on several routes. Those tests completed, a second meeting was held, results were studied, some revisions made, and the manual placed in final form and distributed for use.

In Missouri, and I am sure this also is true in Kansas, engineers with specialized training were assigned for the various estimating procedures. The detailed cost estimates they prepared take into account traffic estimates, necessary road capacities, right of way and other costs, and all engineering features that are required to provide the final highway product. In my opinion, these initial estimates are sufficiently accurate that the next one required by the highway act will not vary too greatly unless unit prices change materially.

It also should be noted, as we discuss finances, that beginning with 1960 the apportionments for the first time will be made on a needs basis as provided in the 1956 act. This will mean that some states will get more, some less, and others about the same as in apportionments made to date.

Up to now the states have made good progress on pushing this national highway program forward. With preliminary organization and planning details well along, they now are in a position to move ahead at an even faster pace if sufficient funds are made available.

The American Association of State Highway Officials believes that Congress should provide sufficient additional money to finance the program under the new estimate, yet hold to the original 13-year schedule or better. There should be no delays!

The association is not alone in its stand. Many governors and other organizations interested in the highway program also have called for repeal of the pay-as-you-go provisions and for authorization of sufficient additional funds to complete the highway program on schedule.

Definitely the achieving of this highway program must not be tied to the economic state of our nation. It is a must whether we are enjoying a high level of economy or whether we are dipping toward a recession. However, with the nation now facing at least a recession if not a mild depression, whichever you want to call it, certainly we should note the good that can be obtained from carrying the program ahead on schedule.

The highway construction program makes a tremendous contribution to the nation's economy. The highway dollar spent locally creates about four dollars of local business and its widespread industrial impact supports many of the basic industries of our country. Thus, to continue the highway program on schedule would have a bearing on moves to get the nation's economy back on an even keel.

CONTINUANCE OF THE PROGRAM

What is being done about assuring continuance of the program? We have high hopes now that it will be held to schedule because the adminis-

tration and Congress both have indicated they are in accord with such a plan. The answer is yet to be determined, however, because each of the governmental units has proposed different plans. It is quite likely that final measures enacted will be a compromise of the plans.

The administration plan was presented to the Senate for the first time on March 11. It proposed that the Byrd amendment be suspended for a period of three years and that \$2.2 billions be made available for interstate system work in 1960, 1961 and 1962, as authorized by the 1956 act. This plan would avoid a cutback in interstate funds but does not increase money sufficiently to put it on the 13-year schedule under revised cost estimates.

A new plan introduced by Senator Albert Gore would hold completion of the interstate system to the 13-year schedule and provide for its entire 41,000 miles. It would increase annual authorizations from \$2.2 to \$3.1 billions, would make the trust fund an interstate account exclusively and eliminate the Byrd amendment.

It was my privilege and honor to be president of the American Association of State Highway Officials when the 1956 act was being considered and was enacted. I want to say its achievement was the result of widespread cooperation.

The Senate and House sub-committees, chairmanned by Senator Gore and Representative Fallon, respectively, worked long and carefully in the hearings and in compiling data for the act as passed. Conference committees of the Senate and House put it into final form.

Administrative officers of all the state highway departments were of great help and the AASHO and Bureau of Public Roads gave every effort that was asked of them.

It is indeed significant that Congress passed the 1956 act in its final form with but one dissenting vote. Surely that is sufficient evidence in itself that the time provisions of the act should be carried out in its original program plan of 13 years, or even a shorter period.

May I add one further thought, with a brief look into the future. It has been the history of road building that as one good road has been built it has served as an impetus to bring others. In my opinion, this national highway program is merely a beginning of things to come.

Completion of the presently designated interstate system is not the ultimate answer. As highway users see and enjoy the benefits of these planned access, divided highways, they are going to demand more and more of them until, finally, most of our arterial state routes will have to be of the same design.

We already have experienced that demand in Missouri. We have made good progress toward dividing two interstate highways across

Missouri, now marked as U. S. Routes 40 and 66. Now cities and highway users along U. S. Route 71 between Kansas City and Joplin, not an interstate route, are pressing for the same type of improvement.

We know others will follow. We know that, as we move into the future, the type of highways we build will continue to be dictated by the will of the people and the development and use of the motor vehicle.

Certainly this highway program and its implications offer us, as highway engineers, a great opportunity and challenge for achievement.