THE INTERSTATE SYSTEM: REVIEW AND FORECAST

Remarks by Francis C. Turner, Director of Public Roads, Federal Highway Administration, U.S. Department of Transportation, at a luncheon meeting of the National Capital Section, American Society of Civil Engineers, Washington, D.C., November 14, 1967 (YWCA)

I am glad to be with you today and especially glad that you asked me to talk about the Interstate System, or the National System of Interstate and Defense Highways, as it is officially titled.

This is the glamor System of the Federal-aid highway program, the System of superlatives, the one which captures the imagination of the general public and the continuing attention of the feature writers.

But despite all the publicity and the widespread interest in this 41,000-mile network, the Interstate System program is by no means well understood by the general public, by the motorists who are paying for it, nor even by some persons in high places who are more or less directly involved.

Myths and misconceptions have accompanied the program throughout its history, sometimes harmlessly, sometimes with damaging effect. I won't try to catalogue all of the misconceptions in this brief talk but to concentrate on just one: that the program sprang up almost spontaneously or as if by magic in the Federal-aid Highway Act of 1956.

I chose this particular misconception because its implications have caused us trouble in the past. And for reasons which I will mention later, we may be reaching a set of conditions where it could cause us trouble again. Back in ~~1956~~ 1958, when we were having financing difficulties, an editorial in a respected publication alleged that the Interstate program

was "thrown together" and "imperfectly conceived." And this, it was said, was at the root of our problems.

Nor was this a lone voice in the wilderness. It echoed a fairly widespread opinion, held even by some influential members of Congress. So partly because of the danger of this misconception and partly because I think you will find it of interest, I want to spend a few minutes giving you a capsule history of the long years of work that culminated in the Interstate program as we know it today.

First, though, a word as to the status of the program. The States now have well over 24,000 miles of the Interstate System open to traffic and construction is under way on nearly 6,000 more miles. Engineering or right-of-way acquisition is in progress on about another 9,700 miles. Thus, work has been completed or is in some stage of progress on 39,700 miles of the projected 41,000-mile System. That leaves less than three percent of the mileage which has not advanced beyond the preliminary stage.

Most, but not all, of this physical progress has been made since and under the Federal-aid Highway Act of 1956. That legislation, as you know, marked a significant milestone in the history of Federal-aid and of Federal highway financing. It broke with tradition in many respects. It provided for a 90 percent Federal contribution to the cost of the Interstate System and departed from the traditional fixed-formula method of apportionment in favor of a method based on "needs." For the first time, it provided for the completion of an entire highway network and made provision for its long range financing. It required the establishment of the design criteria for the System and in some ways defined them. Probably most important of all,

it established a Highway Trust Fund, financed by highway user taxes, from which the Federal government has since paid all Federal highway aid to the States.

These new principles were the culmination of studies and reports going back at least 20 years. As a matter of fact, a good case could be made that the Interstate System and its unique features were the evolutionary products of the whole past experience in road research, design, financing and construction. But this is something like saying that the evolution of the motor vehicle began with the invention of the wheel. It's true but not entirely germane.

There had been much talk about transcontinental highways in the twenties, although most of the talk involved the by-passing of all cities so that their principal function would be to serve long distance traffic. There were also some proposals in Congress that studies be made for one or another individual superhighway linking some east coast city with a west coast city, or running from the Gulf of Mexico to the Great Lakes.

But the first direct step toward the establishment of an Interstate System was taken in 1938. In that year Congress asked the Bureau of Public Roads to study the feasibility of a toll-financed system of three east-west and three north-south cross-country superhighways. The study was undertaken with the aid of the State highway departments and was reported to Congress in 1939 in the publication, "Toll Roads and Free Roads."

The findings were negative as to the self-supporting possibilities of much of the proposed 13,000-mile toll road system. But the study went on to explore and document the need for a system of interregional freeways, with

connections through and around cities. It proposed a network totaling 26,700 miles, with the Federal government contributing more than its traditional 50 percent share of the cost.

In 1941, President Franklin D. Roosevelt appointed a National Interregional Highway Committee to pursue this concept. Then in 1943, during World War II, Congress requested the Bureau of Public Roads to make a study of the need for a nationwide expressway system. This time the Bureau worked not only with the State highway departments but with the appropriate Committees of Congress to produce a single, landmark report called "Interregional Highways," which was presented to Congress and the Chief Executive in 1944.

The study gave detailed consideration to systems of varying lengths, and finally recommended, on the basis of the criteria applied, a network totaling 33,900 miles. The report also foresaw the need for an additional 5,000 miles of auxiliary urban routes, bringing the total proposed system to about 39,000 miles, of which about one-fifth would be in urban areas.

High standards of geometric design and full access control were recommended to assure safety, efficiency and the continued traffic capacity of the proposed expressways, as well as the protection of the enormous investments involved.

Acting on the basis of the 1939 and 1944 reports, Congress in the Federal-aid Highway Act of 1944 called for the designation of a National System of Interstate Highways, limited at that time to 40,000 miles and ... "so located as to connect by routes, as direct as practical, the principal

metropolitan areas, cities, and industrial centers, to serve the national defense, and to connect at suitable border points with routes of continental importance..."

The system routes were to be selected by the States, with the approval of the Bureau of Public Roads, and were to be incorporated into the Federal-aid primary system if they were not already included. And so the long and tedious process of route selection began. By the end of 1954 the States had proposed 43,000 miles of main routes for inclusion in the System. Criteria for selection included service to cities and rural population, to manufacturing and agricultural production, to concentrations of motor vehicle ownership and traffic, and to national defense. Additional criteria in urban areas included consideration of need for through and circumferential routes and their relation to land use, urban planning and civil defense.

There followed much discussion among the Bureau, the States and the Department of Defense, and on August 2, 1947, the general routes for the System were announced. They totaled 37,700 miles, including 2,900 miles in urban areas. The remaining mileage within the 40,000-mile limitation was reserved for auxiliary urban routes.

Again in consultation with the States and the Department of Defense, the general locations of 2,300 miles of urban circumferential and distributing routes were designated on September 15, 1955.

I think what I have said so far may indicate that the Interstate program was neither "thrown together" nor "imperfectly conceived." But let me backtrack a moment. Some short and scattered sections of the Interstate System were already beginning to take shape under the regular postwar highway

program authorized by Congress. During the fiscal years 1946-53, no specific amounts were allocated to the Interstate but the States committed fairly substantial amounts of their ABC money to the System.

In 1952 a token $25 million was authorized for the Interstate System for each of the fiscal years 1954 and 1955, on the traditional 50-50 Federal-State cost sharing basis. In 1954, Congress authorized $175 million for the Interstate for each of the fiscal years 1956 and 1957, and raised the Federal share to 60 percent.

During this postwar period, in 1948 to be precise, Congress asked the Bureau of Public Roads to make another study -- to include the status of the Interstate System and the relationship of highways to the national defense. This study, reported in 1949 as "Highway Needs of the National Defense," pointed out the critical deficiencies of the Interstate routes and suggested that much of the System could be developed by reconstruction and widening of existing highways and by utilizing existing bridges. These expedients later proved to be impractical in the light of astronomically mounting traffic volumes.

In 1954 the late Francis V. du Pont, then Commissioner of Public Roads, took an active interest in the Interstate program and named an Informal Advisory Committee to work with him in studying the whole problem in depth. The Committee discussed not only the advantages, the disadvantages and the risks involved in undertaking the type of Interstate System under contemplation, but also went into various possible financing methods, including the sale of bonds.

The final recommendations of the Committee included these basic ones:

1. That the program should be undertaken and that the System should be so planned and financed that each State would finish its portion of the Interstate simultaneously.

2. That the Federal contribution to the program would have to be in the neighborhood of 90 percent if participation by all States was to be secured.

3. That the program should be carried on through the traditional Bureau-State highway department partnership.

4. That there should be no compromise in the principle of controlled access, nor in the highest possible design standards for the System.

In 1954 President Eisenhower called for a "grand plan" for highway development in a message to the Governors' Conference. He also appointed an Advisory Committee on a National Highway Program, headed by General Lucius D. Clay. In the same year Congress asked the Bureau to make two more studies, which were reported in the spring of 1955. One, called "Needs of the Highway Systems, 1955-84," estimated the cost of the Interstate System at $23.2 billion, not including the 2,300 miles of auxiliary urban routes. (Later the cost of these ~~were~~ was estimated at some $4 billion, for a total of about $27 billion for the System then contemplated.)

The other study, titled "Progress and Feasibility of Toll Roads and Their Relation to the Federal-aid Program," indicated that some 6,700 miles of Interstate routes could be successfully financed by tolls, but reiterated the principle established in the Federal-aid Road Act of 1916: that roads built with Federal-aid should be toll-free. It did, however, recommend inclusion in the Interstate System of toll roads which met Interstate System standards, if there were reasonably satisfactory non-toll bypass roads.

In 1955 the Clay Committee submitted its report to Congress. It proposed a 10-year national highway program to be financed through a Federal Corporation which would issue long-term bonds to be repaid over a 32-year period from the existing two-cent motor fuel tax.

After considerable debate and maneuvering, the measure was defeated, largely because of the high interest costs on the bonds and the fact that, in effect, it removed fiscal control of the program from the hands of Congress.

The 1955 action was only a temporary setback, however. In the following year Congress passed what we refer to as the Federal-aid Highway Act of 1956. Actually this is the name of Title I of twin Acts, Title I dealing with the legislative features and Title II covering the financing features and the establishment of the Highway Trust Fund.

The 1956 legislation declared it essential in the national interest to provide for the early completion of the Interstate System. In recognition of its importance to the national defense, its name was changed to the National System of Interstate and Defense Highways. Because Congress thought some additional and urban connections might be necessary, the authorized length was increased from 40,000 to 41,000 miles.

The Federal share of the cost was set generally at 90 percent with provision for raising this to as high as 95 percent in States having large areas of Federal public lands. The apportionments of Interstate funds were to be made, after the first three years of the program, on an entirely new basis of needs. This meant that any State's share of the annual Federal Interstate funds would be based on the ratio that prevailed between the

cost of completing the System within its borders and the total cost of the System nationally. Thus if a State estimate as approved by the Bureau of Public Roads was three percent of the U. S. total estimate, it would receive three percent of the total Interstate apportionment for a given year. The Act required a series of periodic cost estimates as a kind of self-correcting device whereby any inaccuracies in one estimate resulting in inequities to a State could be compensated for in a later estimate.

The construction program was placed on a pay-as-you-build basis through an increase in the Federal motor fuel tax and the imposition of other new or increased highway user taxes such as those on new commercial vehicles, tires and recap rubber.

This is the basic legislation under which we are operating today although it has been amended many times in accordance with new estimates of the cost of the System, new concepts of the functions it should perform, and constant reappraisal of its long range adequacy in terms of efficiency, safety, esthetics and integration with other modes of transportation.

I will deal only briefly with the successive estimates of cost of the System -- partly because the subject is too complex to be covered in a luncheon talk, and partly because there is a question-and-answer period in which I will be glad to give as much or as little detail as you wish on this and other technical matters. However, since the matter of cost estimates is one of the least understood features of the Interstate program, I want to spend a minute on it.

We are now operating on an estimate of $46.8 billion, including $42 billion Federal and $4.8 billion State funds. This is up from an original

estimate of $27.6 billion made in 1955 and a more recent and realistic estimate of $41 billion made in 1958 and confirmed in 1961. Construction, right-of-way and engineering costs have gone up considerably over the years but the principal reasons for the mounting estimate of cost lie in more enlightened concepts of the purposes and functions of the System. The largest element of increase has come about through changes in the law or practice resulting in better and safer design, through more reliable traffic forecasting, and through more detailed knowledge of site conditions and needs.

Some of the specific factors figuring in the increase are:

A change from the original, fixed 1975 design year to a schedule under which the Interstate sections are designed for the types and volumes of traffic forecast for 20 years after the start of construction.

Added traffic lanes, interchanges and separation structures.

Wider shoulders on long bridges.

Heavier design of pavements to lengthen their service life.

Specific routes added to the System and major route adjustments.

More detailed knowledge and information in roadway elements such as excavation, embankments, drainage structures, utility adjustments, roadside improvements and signs.

Interstate routes are costly. On the basis of the 1965 estimate, the average cost per mile of the System was calculated at $1,170,000, with an average for rural areas of $732,000 and for urban areas, of $3,739,000. Some urban miles run as high as $50 million or more, ~~per mile.~~ Of the total estimated cost of the System as of 1965, about 3 percent would go for preliminary engineering, 16 percent for right-of-way and 81 percent for construction.

Construction includes such items as some 13,000 interchanges and more than 25,000 other grade separation structures. Just during the past fiscal year the Bureau of Public Roads reviewed plans at the contract stage for 2,460 Interstate bridges totaling about 130 miles in length. Construction involves such projects as -- to take a spectacular example -- the Straight Creek Tunnel on Interstate 70, about 60 miles west of Denver. This 9,000-foot tunnel will be the first in the world to be built at an elevation of 11,000 feet. The completed facility will shorten travel by about 10 miles between Denver and points west and will eliminate driving hazards. The existing route through Loveland Pass has severe weather conditions, high snow accumulations and avalanches for six months of the year, with temperatures commonly reaching 50 degrees below zero.

The building of the Interstate System is not only costly, but complicated. State, county and city lines are crossed, and all of these governments, as well as the Federal Government, are concerned with route locations and their effects. Over 80 percent of the System is being built on new location. In some cases an existing road is being reconstructed and used as one roadway, and another roadway is being built alongside to make a divided highway. In other cases, only control of access or new interchanges are needed.

The general public finds it difficult to realize why the construction of an Interstate route seems to be an interminable process. But future traffic needs must be estimated and economic and social effects studied; detailed locations must be selected to best serve these purposes; the ideas and plans of cities and counties must be considered and coordinated; public hearings (at least one and maybe two) are held to give citizens an

opportunity to express their opinions; surveys and plans must be made and bridges and complicated interchanges designed; right-of-way and access control must be acquired -- all of these before a shovelful of earth is moved.

But if the process is costly and slow, the investment in money and time pays off many thousand-fold when an Interstate project comes into use. The sections already opened are proving to be 2 1/2 times as safe as older roads with comparable traffic. Based on this experience, it is conservatively estimated that the completed System will save 8,000 lives per year. Economic benefits to highway users are expected to total some $11 billion during the first year of the completed Interstate System. These benefits accrue from lower operating costs, time savings, lessening of the strain and discomfort of driving and reduced accident costs. The savings figure out to about $100 a year for the average automobile, about $900 a year for a 22 1/2 ton combination, and about $2,200 for a 33-ton combination.

That brings me back to the estimate of cost of the System. It is no secret that the present $46.8 billion estimate is not enough to complete the System anywhere near on schedule in 1973. In accordance with a Congressional directive, the Bureau is putting the finishing touches on a new estimate that will be submitted to Congress in January. This estimate will be higher and will reflect not only increased construction costs, but new safety features and even higher design standards. In brief, the estimate we will be submitting in January 1968, will be based upon a far different System than was contemplated in 1956, 1958, 1961 or even 1965. Probably of greater significance, it will be actually part of a much broader report, also to

be submitted in January and every second year thereafter, on the highway needs of the Nation. This will be of tremendous significance in shaping the future of the highway program.

Among other things it will include a review of the existing Federal-aid systems and consideration of need changes; an analysis of present and anticipated future deficiencies in the rural and urban networks; and analysis of the needs for future highway improvements as reported by the State highway departments; and a discussion of highway financing, existing trends and future options.

This covers a multitude of problems. In connection with the report, a nationwide system classification was conducted, incorporating 66,000 miles of the most important rural corridors not included in the present Interstate System. The study of this mileage was developed in three increments with the purpose of providing a factual basis for considering the possibility of (1) Expanding the Interstate System, (2) Establishing a new Federal-aid system intermediate in function between the Interstate and the other mileage in the present Federal-aid primary system, or (3) a combination of both.

I am not going to forecast the findings of the study but no doubt some additions to the present Interstate System will be proposed. It is certain that many more miles of freeways will be needed under some type of program, especially in the urban areas, where most of our people live and urbanization continues to increase at a troublesome rate. By 1990 it is predicted that we will have some 220 million people living in urban areas -- more people than we have in the entire United States today.

So our plans for future road networks must be accommodated particularly to this ever-increasing urbanization, and the assessment of highway needs

that will emerge in our report next January will be heavily weighted toward that end.

Whatever the new estimate of cost of the Interstate System may be, and whatever recommendations are made as to its future, you may be sure of one thing: After some 30 years of studying it, reporting on it to Congress, winning the legislation to advance it toward completion, and actually building it, our reports to Congress in January will certainly not have been "thrown together" or " imperfectly conceived."