A huge highway construction program faces the United States. To improve America's highways to the desired standard would cost $41 billion, a Joint Committee of Congress reported a few months ago, following intensive study of the problem. Other groups plan the road construction needs of the United States at between $50 and $60 billion, or an average of over $1 billion per state.

The Bureau of Public Roads, after a study completed last summer as part of our national defense program, placed the cost of bringing the 37,800-mile strategic Interstate System up to the desired standard at $11.3 billion. Mind you, this is but 37,800 miles of highway that connect our major cities. Some 1,065 miles of the network are located in Indiana and improvement of this limited mileage is expected to cost over $389,000,000.

The tremendous United States highway problem is further revealed by the huge motor vehicle registration at the end of 1948 of 41 million—an all time high. This figure is expected to climb to 45 million in 1950. If all of the cars and trucks produced in the United States last year were placed bumper to bumper, they would total nearly 20,000 miles in length.

In 1948 some 32,259 people were killed on America's highways, and in 1949 the slaughter was 31,500. Total gasoline consumption and total miles of travel hit new records in 1949. Delays to highway traffic and highway accidents last year cost the United States about $2.8 billions, it is estimated by the National Safety Council.

On Memorial Day weekend of last year, the death toll on our highways amounted to 283, people killed and thousands of others injured —many for life. During the 1949 Labor Day weekend, 355 people
died in U. S. highway accidents, and during the Christmas weekend almost 400 people met death on our highways.

Other staggering figures could be cited to illustrate the large road construction task we face, but today we want to discuss how we can make the highway construction of the next few years most effective.

In other words, we want to consider how we can bring up to date our most basic form of transportation—that of highway transportation, which today is a huge industry that accounts for employment of 9,000,000 people and one-eighth of the national income.

The first big step is the preparation of plans. In this work the state highway departments must make long-range plans outlining programs of several years. The most capable highway engineers in the country must be employed by the state highway departments. To secure such men in adequate number, the states must pay better salaries. For the past several years, the Joint Cooperative Committee of the American Association of State Highway Officials and the Associated General Contractors have been working on this problem. But each person here, plus all segments of the contracting industry, must fight for better salaries for our highway engineers if the huge construction task ahead is to be planned properly.

I am glad to report that the Joint Cooperative Committee of the American Society of Civil Engineers and the AGC, which was organized in 1948, is at work attempting to provide better trained civil engineers for construction. This committee is working hard to improve the ASCE student chapters in all U. S. engineering colleges. The AGC chapters are assisting at every opportunity in this program.

This committee also plans to help in every way possible in providing summer employment for student engineers and to attempt to get more engineer graduates to enter highway construction. Such activity should aid greatly in overcoming the severe shortage of engineers for highway work.

**Consultants Can Help**

To return to the preparation of plan, on both long-range studies and detailed engineering planning, outside consultants who are specialists in the highway field may need to be employed by many state, county and municipal highway departments. It is believed that these consultants can design many special structures without needing to rob the highway departments of their engineers.

Numerous states, including Illinois, California, Oregon, Washington, Idaho, Iowa, Michigan, Minnesota, Mississippi Nebraska, Kansas, Maine, Vermont and others, have already completed long-range plans.
Added states have long-range studies in progress. This is excellent progress.

Advantages of long-range plans include:

1. Needs will be more fully understood and appreciated by the state highway departments themselves.
2. The long-range plan is required to sell the public on financing the big job to be done.
3. Required land can be secured on schedule and at lower cost.
4. More contractors will take an interest and better bids will result.
5. Better engineers can be employed for they will know they can expect employment with the state highway department for several years.
6. Producers of construction materials will be more apt to have the necessary capacity to produce adequate supplies, since they can make more logical investments to meet the large needs to be filled.
7. A big financial saving on the entire construction program will result.

**DIVERSION OF FUNDS MUST END**

Second big step in meeting the nation's highway construction needs is financing the program. This work requires prevention of the diversion of gasoline taxes and other highway-user taxes to non-highway purposes.

During the years 1924 to 1947, this diversion totalled $2.5 billion, according to the National Highway User's Conference. This year about $1.9 billions of new highway construction is expected to be carried out by the state highway departments, which indicates forcefully the great scope of diversion to date. Described in another way, the diversion of highway taxes in recent years was sufficient to construct a total of nearly 100,000 miles of highways, the Highway User's Conference further reports.

Diversion can be stopped effectively only by the states passing anti-diversion amendments. Some 21 states have already taken such action, but the support of the general public must be placed behind the drive for similar laws in the remaining states.

At present the following 21 states have constitutional amendments to conserve highway revenue for highway purposes: California, Colorado, Idaho, Iowa, Kansas, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Missouri, Nevada, New Hampshire, North Dakota,
Ohio, Oregon, Pennsylvania, South Dakota, Texas, Washington, and West Virginia.

It is to be noted that Indiana is without the protection of such an amendment.

To secure adequate funds many states are increasing gasoline taxes. Still other states are not only increasing gasoline taxes but are also passing new bond issues.

**Taxes Increased in 15 States**

In 1949 increases in motor fuel taxes were passed in 15 states. States that increased their motor fuel taxes last year are: Delaware, Georgia, Kansas, Minnesota, Montana, Nebraska, Nevada, New Mexico, North Carolina, North Dakota, Oklahoma, Oregon, Pennsylvania, Vermont, and Washington.

This year South Dakota has already increased its gasoline tax. Increases are pending in Massachusetts, Mississippi and South Carolina.

Increases in motor vehicle registration have also been voted in many states. In all the financing work good long-range plans will be needed and will be invaluable if the financing job is to be accomplished at the required rate.

Those attempting to finance large highway construction programs received a valuable aid in July of last year when the Brookings Institute released a comprehensive report on our highway problem. This study concluded that investing less for highway construction and improvements means greater payment for highway transportation.

**Brookings Institute Calls for More Road Construction**

The Brookings Institute found that if the over-all per mile cost of automobile transportation is to be kept at the lowest possible level, a greater portion of the automobile transportation dollar must be devoted to improving America’s over-burdened highways. Today only 5 to 10 cents of every dollar spent for automotive transportation is applied to the provision of highways, the remaining 90 to 95 cents being absorbed by vehicle maintenance, gasoline purchase and other operating costs. This investment in highways is considered much too small and illogical.

"The logic of this division of the highway transportation dollar appears highly questionable wherever the highway system is inadequate, since the excessive cost of the vehicle may in large part result from this inadequacy. Paying less for highways may mean paying more for
highway transportation. What we save in highway expenditures we may lose in higher operating costs, with lower standards of service the net results,” the report concludes.

Results of the Brookings Institute study were made available recently, when a book by Wilfred Owen entitled, *Automotive Transportation Trends and Problems* was released.

**Actual Construction A Challenge**

After comprehensive planning and financing have been completed, the actual construction is the third big step in meeting the country's highway needs.

This part of the program is where the civil engineers must write clear specifications and prepare good plans. This work must be accomplished in a manner that tells the contractor what is to be done, but leaves him free to choose the equipment he thinks best and the methods he considers the most satisfactory. In other words, state highway departments and local road agencies should specify results, not methods.

**Contract Method Has Many Advantages**

It is assumed, of course, that construction will be by the contract method. This view is taken for the following reasons:

1. Cost of the project is guaranteed before construction starts.
2. Quality is guaranteed in accordance with plans and specifications.
3. The general contractor has the financial incentive to complete the project on schedule.
4. Lowest possible cost is secured through free and open competition between competent general contractors.
5. The detailed planning required by skilled engineers before bids can be taken assures a properly planned project.
6. The contract method centralizes responsibility for construction in the general contractor for maximum efficiency.
7. Experience has demonstrated repeatedly that the construction industry through its normal channels can fulfill public needs more economically and more rapidly than is possible by any other means.

Prompt payment to the contractor must be made as the work proceeds. The highway contractor's investment is huge and his financial responsibilities severe.

At the 1949 annual AGC convention in New York, the general provisions for highway construction contracts prepared by an AASHO
sub-committee were discussed at great length. At this meeting, and at many conferences since, contractor after contractor has urged that the Joint Cooperative Committee, AASHO-AGC, make known to all state and local highway officials the great importance the contracting industry places on prompt payment.

The contractors stress that prompt payment is only good business and that major benefits will result to all concerned. The contractors also consider it highly desirable that much less be retained by the state highway departments on partial payments.

Too Many Payments Withheld

Numerous contractors recommended that their state highway departments could make a big improvement if they would retain only 10 per cent on partial estimates, until 50 per cent of the work is complete, and then retain only 5 per cent of partial payments until the job is completed. Other contractors reported their states long ago saw the value of this procedure and had already placed the policy in effect. Still other contractors reported their highway departments had made even greater improvements.

R.E.A. Contractors Paid Interest

The new contract in use by the Rural Electrification Administration contains the following provision:

“Monthly estimates submitted by the contractor and approved by the engineer for construction accomplished during the preceding calendar month shall become due and payable fifteen (15) days after the date on which they were submitted; invoices for the completed project or completed portions thereof shall be submitted by the contractor to the owner within fifteen (15) days after the installation of the final Assembly Unit required to complete the project or portion thereof and shall become due and payable thirty (30) days after the date submitted. Interest at the rate of six per cent (6%) per annum shall be paid by the owner to the contractor on all unpaid balances due on monthly estimates commencing fifteen (15) days after the date due and on all final invoices commencing thirty (30) days after the date due where such delayed payments are due to conditions beyond the control of the contractor.” Highway engineers may see advantages in the policy of the REA.

Other Ways to Speed Construction

Other ways to speed up highway construction viewed by the contracting industry include:
1. Permit the contractor free use of new types of equipment.
2. Be sure land is available and the job is ready for the contractor to move in and start work when bids are opened.
3. Use local construction materials to a maximum, which will also reduce costs.
4. Cut hand labor to a minimum.
5. Award programs in contracts of various sizes.
6. Work for greater standardization of design to permit, for example, those savings possible where the contractors can use the same types of bridge forms in neighboring states.
7. To make each year’s construction season as long as possible, have some lettings as early as possible each year to permit maximum use of the contractor’s equipment and personnel, and thereby get better prices.
8. Seek a balanced construction program each year.

In regard to the latter point, if a state highway department or a local road agency has a large volume of black-top work one year and none the next, it will be difficult for the construction industry to keep in step and higher prices will be the result.

**HIGHWAY COSTS HAVE DROPPED**

Before ending my general remarks, I would like to report that highway construction costs are now dropping. The Public Roads composite mile index for the first quarter of 1949 was 161.4, which compares to 165.3 for the last quarter of 1948. The drop continued in the second, third and fourth quarters. Costs are now 12 per cent below the postwar peak of the fourth quarter of 1948. Indications are that they are now about stabilized, and 1950 should be a good year for all types of construction.

One final observation. The American public must be kept fully informed of the extensive work that is carried out and the extensive know-how required for highway construction projects. In a nutshell, this means the public must be better informed than ever before regarding what is being done and the great energy going into the program to improve America’s highways.

**SLAUGHTER ON U. S. HIGHWAYS MUST END**

Finally, each of us must remember that almost each half hour at least one person dies in the U. S. from traffic accidents, and, as I
show my slides, almost as fast as I show a new slide a major accident occurs on America’s vast highway network. I repeat that 31,500 people were killed on our highways last year. This slaughter must stop. We must all work hard to accomplish this aim.