

able, and only private enterprise can be depended upon to pay the bill.

Day-labor, as has been amply demonstrated, thrives on waste and inefficiency, taps the public till for its own shortcomings, creates a political tool of tremendous power, and becomes self-perpetuating. The great example of all this is WPA, the misnamed Works Progress Administration: at one and the same time, the great joke and tragedy of recent years. If the billions that have been fed to that great day-labor octopus had been expended on worthwhile public works through private enterprise, by use of the contract system, the nation would have had the greatest era of useful public works construction in the history of civilization, an equal amount of employment during its performance, and a vast tangible wealth as its result. Now we have nothing except an unemployment and relief problem, further from solution than on its inception; some millions of former good workmen, now prime shovel leaners; and a nationwide set-up that is consuming more than twenty per cent of all taxes. Just such a permanent organization, such a permanent problem, each state, each county, each community takes unto itself when it proceeds with construction under the day-labor system. Leave construction to the contractors of the nation on a competitive system; let them produce a dollar in construction value for each dollar in tax money; let them restore labor's morale by competition on the job, by a re-creation of that pride of accomplishment once inherent in the American workman. Let Russia have its governmental serfdom; Italy its corporate state; Germany its absolute control; France its labor riots and state socialism; but keep America for the competitive system and American enterprise.

HIGHWAY ADMINISTRATION PROBLEMS

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The sole purpose of highway administration should be to provide the best facilities and services for highway traffic possible with the available finances. In order to do this well, the administrator must have a knowledge of present road conditions, of highway needs, and of the funds available. He must also have an efficient organization and personnel, and a long-term plan based on the conditions.

State-wide highway planning surveys are now under way in forty-four states, with a large share of the funds being advanced by the Federal Government. Information will be made available by these surveys as to the present highway

facilities, present and probable future highway needs, and the funds needed to give a reasonably adequate highway building and maintenance program. Information should be sufficient to:

1. Determine what mileage of roads in the states can be supported by highway revenues.
2. Determine future construction and reconstruction needs, and an estimate of their cost.
3. Determine the priority of construction projects.
4. Determine adequate maintenance requirements.
5. Estimate future income requirements and a proper budget according to the facts determined.

A decision must be made under the highway needs as to the matter of proper distribution between the main, secondary, and tertiary highway systems. The practice in this respect of various states in the past has been extremely varied. For example, a study made of the use of state funds in 1936 shows that three states returned more than half of their total highway-user funds to local subdivisions of government; eleven states returned over one third of their state income; and five states made no allotment whatsoever. In one state, local roads received \$24,000,000 in state taxes, while in each of ten other states less than \$1,000,000 was distributed for local highways.

MAIN HIGHWAYS

It is our opinion that first consideration should be given to an adequate development of the system of main highways. Such a development, which will attract competitive traffic from other roads and from other states, will give an excess earning capacity to the main routes, which, in turn, will provide funds for lesser traveled roads. A failure to provide adequate and attractive main highways will result in a large loss of potential highway-income to other states having competitive routes.

Laying out the construction of a state highway system requires engineering skill not only of the highest type but of the widest variety of experience. The matter of location requires both skill and broad common sense. Where the funds provided come from highway users, every consideration should be given to their needs. On purely local roads, where the owners of property, through their taxes on personal and real property, are expected to pay the major portion of the construction cost, then, as a matter of equity, roads should be located to serve their properties best.

The average person does not appreciate or understand what a vast array of problems such requirements bring forth. They are problems which require for their solution the scientific background of technical training, broad experience, and an almost uncanny foresight as to what probable demands will be made on that particular road, both as to volume and kind of traffic.

That good salaries paid to qualified engineers are essential for real economy has been demonstrated time and again. I recall one instance in Missouri where, by some relocation made in the secondary road system in 1923 and 1924, a total of seventy-eight miles was eliminated at a saving in construction cost alone of \$1,482,000. The entire saving was not in construction cost alone; the maintenance saving of some \$16,000 per year and a saving to motor owners of \$100,000 operating costs per year could be shown.

ELIMINATION OF POLITICAL PATRONAGE

The large sums involved in highway expenditures and the broad training and experience required in handling them demand that political patronage be eliminated in highway administration. Stable organizations and policies are essential to the orderly and efficient progress of the highway program. Nothing is so demoralizing to the morale of a highway organization as the fact that some members of it feel that they owe their position, and therefore allegiance, to some politician rather than to their ability to perform their duties properly. Highway employees should be entitled to a sense of security in their positions, if their work is properly performed. A logical and systematic line of promotion for qualified men is a long step in building up an efficient organization.

The rapid changes in the development of the modern motor vehicle has created a tremendous problem for highway departments in highway design. New car models with higher speeds are placed on the market each year. Highway design capable of handling cars at the speed possible ten years ago is no longer adequate, for we very well know that drivers are going to continue to use, where possible, the speeds that the manufacturer has built into the automobile.

Many of the states, especially in the older sections, had more or less completed their main routes some years ago, and we often see the lesser used roads with better alignment than the more heavily traveled main routes. The fact that these main routes have been built to some sort of a standard has created in the minds of the uninformed an idea that road building is pretty well along, and that a holiday or cessation of road building can very well be had without great loss.

We who are in constant touch with the situation are often surprised at how far this thought has gone in the minds of even our otherwise most thoughtful citizens and leaders. A group of people living on still unimproved roads cannot understand why a highway department should tear up a hard-surfaced road of a type that they would be glad to have, and spend large sums of money on modernization of those main roads. Probably one of the toughest problems of the highway administrator is to decide where and what percentage of funds available should be spent on this phase of his problem, and

what percentage should be spent on building all-weather feeder roads to the main routes. There is a great danger that unless the necessity therefor is constantly kept before the public, the needs of modernization in the interests of the many, and for safety, will be subordinated to the demands of rural sections for an extension of improvements to roads of less importance.

THE SAFETY FACTOR

The safety element is of prime importance to every individual user of the highway. The highway engineer has a very definite responsibility to build safety into his designs as far as it is physically and economically possible. However, we know that the human element of the driver has more to do with safety than the design of the road. Engineering skill can never entirely compensate for human error and the possibility of mechanical failure. The problem of the highway engineer is to strike a balance between what is desirable from the standpoint of convenience and safety and what other highway needs he can serve with the funds available.

Highways should be designed with adequate width of lanes and with shoulders wide enough to allow for stopping off these traveled lanes. There should be no deep side ditches. Roadway surfaces should be smooth and as non-skid as possible. Ample sight distance, both vertical and horizontal, should be provided. Ample sight distances are not always economically possible in rough topography, but much can be accomplished along this line by providing additional passing lanes. Adequate signing can do much where funds are inadequate for desirable construction.

ROADSIDE DEVELOPMENT

Another problem in highway administration is to determine how much, if any, of the highway-user funds should be spent for roadside development. Some may not see the economy of beauty on the highway. Shrubbery properly placed along the road will act as a perfect, beautiful, and permanent snow fence. Flat slopes, well sodded, cut down erosion. On steeper slopes, honeysuckle is very effective for the same purpose. Proper roadside development makes for substantial saving in annual maintenance charges, and I am convinced that the expenditure of additional funds for trees and shrubs is well worth while. When we put up a public building, no one criticizes a reasonable expenditure for architectural treatment beyond the bare necessities of the space required; we all are pleased when funds are spent in properly parking the grounds around them. We do the same thing when we spend our own money in beautifying our homes and grounds.

Attractive roads bring additional visitors to our state. This tourist business is of great commercial value. Michigan and Wisconsin consider it one of their main businesses. Quoting from Mr. Torkelson, Director of Regional Planning for Wisconsin: "While we, as highway builders, cannot and should not forget such things as cost of construction, maintenance and operation, whose amount we can measure, and the equally important consideration of safety which we cannot measure, we must begin to give a weight approaching adequacy to that third and neglected member of the highway trinity, namely, 'beauty'."

Much of the ugliness which we have built in the past is unnecessary and can be eliminated by proper design. In general, natural landscape is beautiful; and our design should attempt to keep it that way. By a careful handling of borrow pits and cut slopes, most of the scars of construction can and should be eradicated. When beauty is built into a road, householders along the way soon show a disposition to clean up and beautify their places to conform.

The problem of what to do about outdoor advertising is still with us. The northeastern states seem to have accomplished more in the way of regulating and restricting roadside advertising, especially Massachusetts and Connecticut. By the requirement of a license from each sign company and a state permit for each sign, however small, with an annual fee adequate to eliminate small signs and discourage large ones, much has been accomplished.

Massachusetts has a permit fee of \$4.00 and a setback of 50 feet from the right-of-way line for all signs, plus a setback of 100 feet to 300 feet for large signs. By these methods, Massachusetts has eliminated all the small signs except those connected with filling stations and lunch stands. The setback is eliminating a good many of the large billboards. Connecticut has eliminated all tack signs on trees, fences, etc., and most of the small signboards.

PRESSURE GROUPS

Mention was made in the opening paragraph of the need for a long-term plan based on present road conditions, highway needs, and the funds available for construction. Mr. R. H. Baldock and Mr. C. B. McCullough of Oregon have recently worked out and published technical bulletins showing mathematical methods for measuring the relative economic desirability of highway extension and improvement projects. By means of these formulas, it is possible to determine the justification for and priority of construction of roads which are desired to be built from funds from various sources.

From an administrator's standpoint, it would be a fine thing if the problem of what roads to build and when to build them could be worked out as a mathematical problem. How-

ever, in most states, where funds are not nearly sufficient to do needed and desired work, the decision is not easy. Unless one has gone through the experience, it is hard to realize the pressure that is placed upon an administrator from various groups who sincerely believe that the projects they desire are more important than any others. These organized groups are of various types. We have the chamber of commerce groups, rural mail carriers, farmers, school authorities, politicians, church congregations, salesmen of equipment and materials, and various other types of promoters. In a highway administrator's office a number of these groups pay visits every day urging the surveying and construction of projects in which they are interested.

I do not want to be misunderstood and decry the need of a long-term plan, because that is certainly necessary to get anywhere toward perfecting a modern highway system, but I do want to show that there are other factors that sometimes have to be considered in the picture. Highway administration calls for the utmost diplomacy, and its problems presented every day are numerous and varied.

JOINT HIGHWAY-RESEARCH PROJECT BETWEEN
INDIANA STATE HIGHWAY COMMISSION AND
PURDUE UNIVERSITY

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The Joint Highway-Research Project between the Indiana State Highway Commission and Purdue University is authorized by an Act of the Legislature with an appropriation of \$50,000.00 a year for highway research and highway extension, beginning July 1, 1937. The purpose of this act is to assist Purdue University and several counties of the state in developing different methods of construction and maintaining the highways of the state and the respective counties. The provision for highway extension includes the Annual Road School under operation today at Purdue University. The act also provides that the county and state highway officials, in co-operation with Purdue University, may hold joint road meetings in the various sections of the state.

The activity of Professor Petty in highway extension during the summer of 1937 included visits to fifteen counties of the state. Twenty-seven public educational meetings were held, attended by over 1,000 individuals. Over 1,500 miles of highway were inspected in company with county highway officials who are helped in their duties by such unbiased counsel. The more skillful and economical maintenance of county roads will be one result of such conferences.