

PROGRAMMING HIGHWAY CONSTRUCTION

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When one undertakes a new job, he must carry on the day-to-day work and must plan for what is to come. If the new job is that of Commissioner of Highways, making a plan for what is to come is a complex problem.

Since our conference here is largely a family affair—all of us being concerned with how to provide Kentucky with the best possible roads and streets—it seems to me a look at the planning job of the Department of Highways may help its employees directly and be suggestive to those of you concerned with only one county or one city. I have talked about this plan to two or three groups made up of people who were mainly nonparticipants in the planning job. I want to discuss the situation today with the view of inviting your help in accomplishing better highway construction and maintenance than has ever before been done in this state. We have all the experience of our predecessors to build on and so we *should* do the best job yet just as our successors should improve on what we do in the period immediately ahead.

First of all, let me emphasize that planning for the future in our calling is a two-fold task. The year immediately ahead must be planned in detail; and, for reasons I shall attempt to make clear, the period further ahead—about six years—must be programmed with care but not necessarily on a month-to-month basis. The year ahead must embody all the work of the Department of Highways and must take as much account as possible of the work other agencies, such as counties and cities, will be doing on roads and streets. The longer range plan must take general account of maintenance and service functions but must emphasize construction.

Although I shall make incidental reference to short-term planning as I go along, I want to discuss primarily the long-pull problem. This plan for six years ahead is a combination of an engineering plan so to speak and a financial plan. That is, it is a capital budget—a management tool which is old in the world but comparatively unknown in this state.

The Kentucky Department of Highways is laying the groundwork for road and street planning which will achieve several objectives of importance to the people of the state.

1. The amount of money available for highway construction and maintenance is always too little to do the job. It probably always will be. Consequently, the establishment of road construction and maintenance priorities is of profound importance. Indeed, this is the point at which public policy issues are prominent. In other words, it is the stage at which enlightened politics is important—and the only such point in highway planning. But truly enlightened politics must be based on cost estimates and a knowledge of the potentialities of various highways for serving the people of the state, involving a knowledge of the amount and character of probable traffic when alternative road or street improvements are considered. Decisions to build particular highways without such facts assure a waste of scarce money.

2. The effective employment of the money in sight depends on prior planning. Otherwise, some of the money will not be truly *in sight*. Not only will failure to budget result in wasteful expenditure but it will also result in spending less than all the money actually available. For example, in recent years the Department of Highways has rarely closed a year without carrying forward a big balance at the

same time that crying highway needs are unmet. This practice means uneconomical postponement of needed construction.

3. There can be, as a result of effective planning combined with faithful execution of the program scheduled, a much improved highway production from each of several viewpoints. A good job of budgeting, it seems to me, must take account of programming, financing and scheduling of projects in terms of continually employing effectively, without undue peaks and other periods of very light work loads, all the persons engaged in the various phases of highway construction, programming, engineering, right of way acquisition, construction contract procurement, grade and drain construction, paving and inspection and related tasks. This smoothing and balancing process must be combined with a full consideration of all classes of state roads in all parts of the state. If a capital budget for highway construction is developed with full consideration of these and other factors which must be planned into the road and street construction schedule, the advantages will be apparent in several ways, and the advantages will be enhanced if carefully linked with other state and local planning. In the first place, avoiding "pressure work" on the one hand and work famines for various classes of technical employees on the other will greatly increase productivity, resulting directly in more roads for each dollar spent. At the same time, it will facilitate the exploitation of road machinery and other mechanical possibilities. In the second place, such a program will be more satisfying to the professional staff and thus indirectly contribute to more production for each dollar spent. Along with this secondary consideration is the fact that management of the far-flung, complex department can be greatly simplified by faithfully following a planned program rather than by jumping from one thing to another as has been the practice heretofore. Fourthly, contractors and their suppliers could save money by having an adequate published construction program executed with deliberation available to aid in their own planning. This saving would in time, of course, be reflected in better bids. The state, then, would save taxpayers' money. Fifthly, such planning tied in with adequate reporting can contribute heavily to wider-spread public understanding and support.

It seems to me that these few examples of possible achievements show the obvious necessity for a policy of working out a construction and maintenance program and a plan for its financing. While this conclusion appears unassailable, the state lacks such a program today although valuable first steps in that direction have been taken under Governor Chandler's leadership.

To work out the sort of capital budget for construction that I would suggest—one looking perhaps six years ahead—I think there are four elements we should consider. (1) We must know continuously the amount of money available and must have well-based estimates of the amounts to become available—for the immediate future by months and for six years by years. These amounts must be viewed in terms of sources and of classes of roads on which the money may be expended. For the budget period or periods immediately ahead, we must have detail estimates according to a variety of other breakdowns. (2) We must select work projects for each road system and for all parts of the state on the basis of sound information regarding estimated costs, road conditions, and traffic needs woven into the wisest policy we are able to define. In doing this, we must establish priorities for guidance in timing all phases of our work. (3) As is implicit in what has been said, we must employ technical and political acumen of the highest order, we must have real statesmanship, in programming and in establishing priorities. For the other aspects of our construction plan we must avoid political considerations and rely strictly on technical judgments. (4) We must effectively and continuously tie together the money availabilities and the programmed priorities in a schedule which will form a construction budget for a period of six years. Along with programming and establishing priorities, this task should be the most exacting one resting on the shoulders of the Commissioner of Highways personally. It should, of course, be performed with the continuous advice of the engineering staff on the one side and of the financial management staff on the other.

THE MONEY AVAILABLE

At present and for many years the Department of Highways has accounted for its finances primarily on the basis of reflecting commitments when they are made, but without any adequate breakdown by classes of construction. It is, of course, highly desirable to have such records—but with improved reports. Indeed, these accounts and reports are legally and practically essential. To control as elaborate a program as Kentucky's especially with federal aid and bond funds to take into account, however, more is essential. In short, we need to account for money in sight by sources; for commitments with breakdowns of many sorts, perhaps the most essential of which is by classes of roads; and for disbursements with various breakdowns. We have serious shortcomings in each of these areas—not to mention several other accounting limits on good management.

When adequate accounting data are at hand, taken in conjunction with budget data provided by revenue estimators, it will be possible to project, by months for a year and annually for six years, what money can be spent, subject, of course, to the already-mentioned uncertainty as to future federal aid. This projection can be made on the basis of existing financing provisions in terms of highways that are interstate, federal aid primary, federal aid secondary, federal aid urban, nonfederal aid, rural secondary, and rural highways. It will also be possible to control expenditures currently for each class of roads in terms of both commitments and disbursements.

One special problem of expense distribution that is handled inadequately in present records is that of developing cost data for purposes of billing the Bureau of Public Roads for federal aid. In the case of right-of-way work, for example, how much Division of Right of Way cost is properly billed for a particular federal aid project (a) in the event the appraisals or negotiations or both are done under contract or (b) in the event all or part of this work is done by the departmental personnel?

Not only is the record for work by projects essential, but there are also larger aspects of financial policy involved. As you know, the Bureau of Public Roads does not *advance* money for the projects it approves. On the contrary, the state does the work and *then* bills the bureau. When this process involves 50-50 money, it means Kentucky must continuously finance the federal share to the tune of several million dollars. When 9 to 1 money is involved, the amount of the advance for Uncle Sam becomes prodigious! This financial chore is rendered much more onerous by the method heretofore employed of billing for preliminary engineering and right-of-way work only after completion of construction. It is also made more troublesome in the case of right-of-way cost recovery than would otherwise be necessary by the complexities of bureau billing requirements as the state develops current invoicing. To secure reimbursement to Kentucky of the bureau's share of right-of-way expenditures on the basis of progress reports, the information must approximate in detail the kind required for final settlement.

Because the interstate highway work has got under way at more or less the same time the bond issue proceeds became available, the financial load due to the necessity of financing the United States' share of the cost has been obscured. That is, the additional matching money permits state road fund advances to pay initially for the Bureau of Public Roads' share of road costs. The net consequence is that a very large proportion of the \$35 million in bond money already available is or will be committed with state road fund financing of the bureau's share of the interstate work. This investment of state money in financing the United States Government's share of the cost can never be prevented under present federal policies. However, by prompt billing, the state can cut down on the proportion—but perhaps not on the amount—of money thus employed.

THE CONSTRUCTION SIDE

Even though what has been said gives only a hint as to the complexities of the financial side of the highway planning problem, let us turn to the physical

aspect of programming and scheduling construction—forgetting maintenance work for purposes of this discussion. As has already been observed, the first prerequisite of good planning is adequate information. And the Kentucky planning staff largely lacks the facts. True, the state has considerable traffic statistics, but the figures are not very dependable except for primary highways. Even for these roads, the data are not fully up to date. The division has little information about the character of traffic, especially loading practices, on either city streets or secondary rural roads. It does have reasonably satisfactory information, such as can be derived from origin and destination studies for many urban areas.

The road, the street, and to some extent the bridge inventory data are incomplete. Somebody in each district office knows a great deal about the character and condition of the local roads. But the information is not assembled. To a considerable extent it is not even recorded. As a consequence, there is no way of employing the data for planning priorities for reconstruction—or for original construction.

Steps are being taken to improve in these respects, but they cannot be accomplished rapidly. For example, the construction staff for the off season is being diverted in part to traffic count and inventory work.

As the interested public knows, the programming now is being based largely on Automotive Safety Foundation advice. This in turn is rested on the partly unsatisfactory data in our Division of Planning. The problem for Automotive Safety Foundation—and for the Department of Highways—is much more difficult on the secondary road system than on the sort of highways for which recommendations have been submitted. Immediate decisions as to how much secondary road work to schedule and which particular roads to construct must be made with something short of a sound basis for the determination of priorities. It is the present thought that a review of plans for the period beyond the immediate future can be undertaken with more facts in sight than are available now. And that is true whether or not provisional decisions for the long pull are made shortly.

Once a road program is set up to use resources which will become available during the coming six years, the primary decisions concerning priorities are made. There are important scheduling issues still to be confronted. Of course, in a degree these decisions are concerned with the determination of priorities, especially where emergencies of some kind are involved. Scheduling to use the money available for each class of highway, however, must also be concerned with effectively employing available money, but not exceeding it, to make it go as far as possible. Some of the criteria involved can be mentioned particularly.

1. The schedule must be devised to keep all phases of highway work in process at all times but without hurry-up tasks. The department maintains a location staff, a design staff, and a right-of-way staff. It contracts for grade and drain and for surfacing work. It must do inspection and other chores incident to the completion of projects. To keep all employees on these classes of jobs at work continuously, the schedule of programmed construction must time the various projects so that work at all stages in each part of the state is going on, as nearly as possible, all the time.

2. Construction must be well distributed geographically. The schedule must, therefore, be built so that work is continuously in process all over the state—not necessarily, but desirably, at all times in each county. This wide distribution is necessary not only because the public demands it, but also because such distribution will most effectively employ the manpower and physical resources. Because of this criterion, although other construction in the vicinity of high-priority interstate projects cannot be entirely discontinued, emphasis must be placed on projects not in the same community as the scheduled interstate work.

3. The schedule must be formulated in such a manner as to distribute each season's construction properly among different classes of highways. This is true whether the classification as interstate, trunk-line, county arterial, and county feeder roads (and similarly for cities) in terms of the character of the highways or

as interstate, federal aid primary, federal aid secondary, federal aid urban, non-federal aid highways, rural highways or rural secondary in terms of sources of support.

4. Highway construction scheduling ought to be worked out with some consideration for other public construction activities. In some cases, highway work must be undertaken because of other construction. An example is the coordination of road and park development. If public nonhighway constructions is heavily localized, then highway construction elsewhere may properly be emphasized, especially if the use of materials or manpower of particular classes will be competitive. Perhaps the best example in the recent past is the Atomic Energy Commission project near Paducah some years ago.

In particular cases, scheduling programmed road construction must be governed by still other criteria, but the four enumerated are the pervasive considerations which govern the development of a construction schedule.

The outline of the major criteria for the development of a construction budget for a period of about six years implies certain questions. I shall allude to one or two now, and will be glad to tackle others if you wish to raise them. Perhaps the major query this sketch will raise in your mind could be formulated as follows: If a six-year plan is worked out and adhered to, how can the Department of highways adapt to changing conditions? This must be answered several ways because several techniques of adaptation will be essential.

1. Like any modern budget, such a construction plan must continually be in a process of adjustment. For example, if additional money should become available for construction, the programming of additional work or the accelerated scheduling of already-programmed work would be essential. Moreover, as already observed, the coming year is the only one for which the schedule as a whole is even roughly final. From year to year, the schedule is replanned in the light of progress already made and of needs. True, assuming no change in available resources from those anticipated, inserting a new construction project of any one class (in terms of revenue sources) will necessarily mean dropping one or more projects of roughly similar cost to avoid a schedule of work out of line with the available money. This sort of replanning is standard practice in capital budgets.

2. Then it is anticipated that a contingency reserve will be set up. The administration has publicly announced a policy of constructing access roads when doing so will contribute to a new industrial development sufficient to justify the road construction. These obligations cannot be foreseen, and so they must be handled as contingent requirements. This practice is very much the same as that incorporated in modern budgets generally. For example, in Kentucky general fund budget administration, there is a general contingency appropriation which is often referred to as the "Governor's emergency fund."

It should be kept in mind that comparatively minor adjustments of either sort ought to be sufficient to take care of needed adaptations except for the kind of construction which cannot be scheduled. If the vast bulk of all construction can be programmed and scheduled, that is *budgeted*, and it can, then the department can make each construction dollar go farther than otherwise would be the case.