

# DEVELOPMENT AND IMPLEMENTATION OF MANPOWER PLANNING IN THE VIRGINIA DEPARTMENT OF HIGHWAYS

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The conduct of the study and the initiation of the Virginia Department of Highways' manpower planning followed a management-by-objectives approach. Of particular importance was the proper blending of the conceptual ideas of personnel in staff positions with the practical expertise of those in line management. A pilot approach was used for one rural and one urban area; of particular concern was the training of employees in the personnel division to carry out manpower planning on a continual basis. Results cited include the expansion of the planning of maintenance activities from a previous level of 40 or 50 percent to roughly 80 percent, the institution of a permanent organizational unit to carry out manpower planning on a continual basis, and the fact that the department is now engaged in manpower planning for about 66 percent of its employees, an effort that has already resulted in more than \$2 million annual savings. This manpower study was one of a series—and not the most important one—of studies that has helped to initiate a management-by-objectives philosophy in the department and to create the savings previously cited. In speculating about the future, the writers have suggested that manpower, equipment, financial, and materials planning will be more integrated but that the effectiveness of the system is no greater than that of its component parts; specifically, the conceptual aspects must not be greater than the understanding and cooperation of line management.

• PRIOR to 1967, the Virginia Department of Highways performed manpower planning—the selection, utilization, and development of employees—on an intuitive basis. In that year, it was decided that manpower planning should be formalized to provide for a more orderly and systematic program. Moreover, the increasing size of the organization had made it more and more difficult to deal with the manpower needs of the department without clear-cut plans.

The top management of the department recognized the need for comprehensive manpower plans and assigned the development and implementation of a manpower planning system to a task group composed of staff members from both the Virginia Highway Research Council and the personnel division of the Virginia Department of Highways.

The task group members realized that there were both tangible and intangible reasons for launching this effort. The tangible reasons were as follows:

1. The department had 12,000 employees, an annual payroll of \$66 million, and employee assets that were viewed as at least equal to \$132 million of capital investment; and
2. Annual losses to these assets were more than \$2.8 million because of personnel turnover.

The intangible reasons for investigating manpower planning were as follows:

1. Ensure that the talents within the organization are used efficiently;
2. Ensure that employees feel that their interests and those of the highway department are compatible;
3. Ensure that the employees as well as the organization prosper; and
4. Ensure that the taxpayers receive an optimum return on their investment.

The objectives of the department's manpower planning efforts can be divided into three types: organizational, financial, and administrative.

## METHODOLOGY

Close liaison between management and task group personnel is of primary importance in a task such as the development and implementation of manpower planning. Efforts that do not properly consider current methods or provide for resource inputs from the ultimate users of the system are likely to fail. As a general approach, it was concluded that manpower groupings would follow traditional lines: classifications (engineer, inspector, etc.), organizational units (divisions and sections), and/or geographical location (districts, residencies, and areas). The analysis of these groups was based on interviews with employees and statistical data.

A key factor in the methodology was the scheduling of frequent meetings between the study group and line management in order to blend the conceptual knowledge of the former with the practical knowledge of the latter.

Specific approaches were carried out on a pilot basis. The Staunton District (Appendix A), one of eight construction and maintenance districts of the highway department, and the Fairfax Residency (Appendix B), one of the department's 44 construction and maintenance residency areas, were used as pilot study areas. The Staunton District represented a rather large, primarily rural organizational unit, whereas the Fairfax Residency represented a highly urbanized unit.

In organizational terms, the specific assignment of the task group was to "institute systematic and improved manpower planning processes and to develop tools and techniques in an organizational framework to ensure continuity of these processes." In other words, this was to be an applied research project. The task group was asked to define the manpower planning needs of the highway department, institute a program (at least on a pilot basis) to meet those needs, and provide the ways and means by which the program could be implemented on a department-wide basis.

The financial objective was to reduce the payroll from the past average of more than 20 percent of total highway expenditures to no more than 18 percent. The objective would be achieved through greater productivity of employees and a reduction of the work force by normal attrition. It was reasoned that this would yield annual savings of \$6 million based on current work loads.

The objectives in manpower administration included the following:

1. Improved utilization of current employees;
2. Integration of individual and organizational goals;
3. Anticipation of future employee requirements and of measures necessary to fulfill them; and
4. Training of personnel division staff to accomplish the preceding goals on a continual basis.

The specific approaches used in the pilot areas included the following:

1. Delineation of the objectives to be accomplished—a forecast work program.
2. Conduct of a manpower audit—the determination of the number of employees necessary to accomplish the program in terms of their skills and classifications.
3. A manpower inventory—an assessment of how many employees the pilot areas had on hand in terms of skills and classifications.
4. Identification and projection of loss factors—a projection of future employee improvable turnover (resignations and removals), retirement, and death;
5. Forecast of anticipated employee deficits or surpluses by employee class;
6. Designation and recommendation of remedial action to obtain the necessary number of employees for the objectives to be accomplished; and
7. Utilization of the findings from the pilot areas on a department-wide basis.

The key to the methodology was to apply a management-by-objectives approach to the two pilot areas and to ensure that this approach would, over a period of time, be adopted throughout the department. Included in the task, therefore, was the develop-

ment of an appropriate organizational framework that would facilitate department-wide implementation of the methodology developed in the pilot studies.

## RESULTS

The results of the pilot studies of the Staunton District and the Fairfax Residency in terms of the maintenance work load of the department were as follows:

1. The management-by-objectives philosophy was introduced and applied in the areas both by the investigators and by the line management involved;
2. Manpower authorizations determined in relation to need were stated for the organizational units;
3. It was noted that personnel transfers from areas of surplus to areas of shortage would result in considerable benefits to the department;
4. Maintenance activities are now planned for roughly 80 percent of the objectives as opposed to only 40 to 50 percent at the time of study; and
5. Annual savings generated by these and subsequent studies have amounted to more than \$2 million.

As a result of the study, specific recommendations were made with regard to the functions of individual management positions including authority, responsibility, and accountability for manpower management. These recommendations are the key to a successful manpower planning or management-by-objectives system. Employees must understand and approve of a system if it is to succeed.

Another result of the study in the pilot areas was an increased recognition on the part of the study group and other members of the department that money, men, materials, equipment, and planning are interrelated. Also, it was recognized that, when these items are planned separately, the plan is only as useful as its least useful component.

It is emphasized that the level of sophistication of an effective manpower planning system must not exceed the understanding of those who implement it.

A significant result of the study was the establishment of a manpower planning section within the personnel division of the department and the training of the section head in the processes of manpower planning and highway operations. This section is now operating as an independent unit.

In overall terms, the department's manpower planning efforts to date have resulted in extending manpower planning to all of its employees (on a fairly systematic basis); about 66 percent of its employees are presently covered.

Financial savings are beginning to appear in both the maintenance and construction operations as a result of this and other related studies. More specifically, it is estimated that \$907,000 is being saved annually because of manpower planning for construction inspectors and that unit cost savings through the use of manpower planning and performance budgeting in maintenance are more than \$1.5 million yearly (Appendix C). These figures represent \$2.4 million of the \$6 million target proposed by the researchers.

Subsequent to the manpower planning study, a study of Virginia's governmental units was ordered by the Governor and a self-study was conducted by the highway department. The results of these studies corroborate, in many instances, the manpower study findings.

As a result of the various studies, top and middle managements are adopting a management-by-objectives philosophy. When this philosophy is fully adopted, the term manpower planning will refer only to the personnel aspect of a management-by-objectives system.

## FUTURE APPLICATION

The department is now engaged in performance budgeting for its maintenance system and in manpower planning for construction and materials personnel. In addition, the

department is studying equipment utilization and management. The equipment utilization and management study is a result of the emphasis on manpower and the obvious relationship between equipment and manpower delineated in the manpower study.

In further recognition of the management-by-objectives philosophy, the department has created a Management Services Division that is a direct result of the increased emphasis that has been placed on the discipline of management by the department. Finally, it should be noted that the authors are not implying that the manpower study described in this paper was responsible for the ultimate development of management into a divisional part of the department's organization. The research investigation was merely one of a series of studies that has led to the recognition of the need for increased emphasis on management by the department. It is presumed that this need exists in other highway departments as well.

## APPENDIX A

### SYNOPSIS OF THE STAUNTON DISTRICT PILOT AREA STUDY

The conclusions and recommendations of the manpower study of the Staunton District follow. They are in turn followed by discussions of the principal areas of concern in the study: improvable turnover, management training, employee classification, employee motivation, and district field employees.

#### Conclusions and Recommendations

1. To ensure continuity and effective growth of the manpower planning function, the manpower planning section within the personnel office should do the following: (a) implement the techniques developed in this study on a department-wide basis; (b) initiate a management-by-objectives training program for line managers as an integral part of the manpower planning function; (c) include extensive field involvement and participation of line managers as a functional part of the manpower planning process (such a cooperative relationship should promote the integration of line and staff in the manpower planning process); and (d) provide a framework from which financial and manpower planning can be carried out on a continual basis so that each department line manager understands management practice.

2. The data available in the maintenance management system should be utilized to develop effort, accomplishment, and fund allocation indexes for each residency and maintenance area within the state.

3. Analysis of personnel turnover should become a part of the personnel division's annual program, and the detailed findings of the analysis should be released to each division manager.

4. The problem of employee turnover (separations due to resignation and removals) should be viewed generally in terms of those employee classes that have a turnover rate of 10 percent or more and that are difficult to train and replace. If, however, training and replacement within a classification are exceptionally time-consuming and expensive, a turnover rate of less than 10 percent may be critical. If training and replacement are not a problem, or if a classification includes too few employees for statistics to be meaningful, a turnover rate of more than 10 percent may not be critical.

5. To solve the turnover problem, the department should use a selective approach in implementing the following actions: (a) increased attention to the supervisory skills of managers where turnover and poor morale are evident; (b) improved utilization of the existing classification system to provide promotions where vacancies exist or to give early promotions to within one step of the next higher grade; (c) more intensive recruiting efforts in the affected classes; and (d) salary evaluations of the affected classes.

6. The state personnel department should be requested to make periodic surveys of wages and benefits given by industry and other government agencies within Virginia

to ensure that department employees in the critical classifications receive comparable compensation.

7. Special goals for utilization of employees (field manpower levels) should be adopted in accordance with the effort, accomplishment, and productivity indexes to plan for future growth.

8. A priority objective that could be established with regard to manpower levels would be the accomplishment of more work without a proportional increase in the number of employees.

9. A 5 percent annual increase in productivity for 3 years would result in an annual savings of \$480,000 for the Staunton District. It is estimated that department-wide application of this increased productivity concept would result in more than \$3.5 million annual savings.

10. Increased needs for additional personnel can be partially offset through elimination of personnel surpluses—only through attrition, of course.

11. Uniform increases in manpower and funds are unwarranted.

12. It is believed that man-hour and manpower planning for district field forces should relate not only to planned and unplanned activities but also to planned maintenance, unplanned maintenance (no more than 25 percent of planned), maintenance replacement, and state force or incidental construction. If this is done, man-hours will be more than 80 percent planned and will be related to job objectives as compared to a 40 percent figure for net planning.

13. Consideration should be given to a detailed evaluation of the classification structure. Current disparities between engineering and administration divisions and construction and maintenance activities should be included in this evaluation.

#### Improvable Turnover

Separations from the department due to resignation and removal have been analyzed from the point of view of classes of employees. In examining employee classes, all classes with a turnover rate of 10 percent or more have been cited.

The summary data suggest that one-third of the department's employees account for two-thirds of the turnover rate. Because turnover is not uniform throughout the department, it is believed that it can be considerably improved.

The turnover problem is not critical generally because most classes of employees can be replaced and trained without great difficulty.

The employee turnover problem is critical when hard-to-replace job classifications are affected. Additional classes of professional employees that were deemed crucial (bridge, traffic, transportation, and urban planning engineers) represent only 83 employees. There are 26 classes of employees that fall in the critical or crucial categories. These 26 represent only 1,200 to 1,300 employees, or less than 15 percent of the department's labor force.

One or more of the following actions, depending on the circumstances of the employee class, is recommended for solving a turnover problem in a critical or crucial employee category:

1. Investigation of management and morale of the classes of employees involved and implementation of remedial action where decided on by line management and the personnel division;

2. Improved utilization of the existing classification system with regard to promotions, i.e., promote where vacancies exist or give early promotions within one step of the next higher grade;

3. More intensive recruiting efforts;

4. Salary evaluations; and

5. Support and follow-through of the preceding items by the personnel division.

The turnover problems of the department can be considerably reduced if implementation of the findings and recommendations of this report is carried out by line management, the personnel division, and the state personnel office.

### Management Training

The line-staff management-by-objectives approach used in Staunton was most beneficial from the standpoint of the following:

1. The management training of line managers;
2. The acquaintance of staff with field operations and with how the staff's activities should be related to the improvement of line effectiveness; and
3. The effective integration and management development of line and staff as separate entities and as a management team.

Originally, the researchers felt that appropriate manning tables could be drawn up in an almost textbook fashion and be given to line management at Harrisonburg and Staunton to be filled out. Harrisonburg residency officials, however, requested an analysis of their manpower allocation and utilization practices before the development of a manpower plan. A combination of computer-stored maintenance data, principles of management by objectives, and the intuitions of line managers was used to perform the analysis. This was followed by the development of a 3-year manpower plan.

An eclectic method such as the one used in Harrisonburg is an excellent management training technique because, unlike the classroom, it is related directly to the line manager's area of interest. Development of such data generates maximum attention to and utilization of the principles of management by objectives and return-on-investment analysis.

The attempt is to combine academic management principles with operational management problems and solutions to forge a more effective (and less expensive) tool than classroom training.

### Employee Classification

During the course of the study there were certain comments that were repeatedly encountered by the researchers. These related primarily to questions concerning knowledge, skill, and ability requirements and salary differentials that exist between employees associated with construction and maintenance activities and between employees of engineering and administrative divisions. No formal collection of such comments was made, and no documentation or analysis is provided. Nevertheless, the prevalence of the opinions seemed to suggest that the study would be incomplete without some reference to them.

### Employee Motivation

The researchers spent little time on motivation aspects. It is suggested, however, that considerable effort will be directed toward motivation in the final phase of the study. It is further stated that two approaches considered at the June 1969 meeting of the Research Advisory Committee to the Economics, Finance, and Administration Section of the Virginia Highway Research Council may be used. These are (a) an audit and analysis of the exit interviews performed by the personnel division and (b) personal interviews with employees.

### District Field Employees

The report discusses the objectives of work program accomplishment in relation to the utilization and allocation of district field employees.

Maintenance management records system data can be used as source data for effective man-hour and manpower planning. It is suggested, however, that these data should be used in terms more related to total management objectives such as planned maintenance, unplanned activities (no more than 25 percent of planned), maintenance replacement, and state force or incidental construction.

It is further suggested that, because of increased requirements (Route 64, rest areas, weighing stations, and chemical bins), there will be a need for more than 120 new employees in the Staunton District in the next 3 years if there is no increase in productivity. With improved management and employee effectiveness (a 5 percent

annual increase in productivity for 3 years), this need would be reduced by 80. If this figure is extrapolated department-wide, the anticipated increase of more than 1,300 personnel would be reduced to 500, which would mean an annual savings of more than \$3.5 million.

The following findings were emphasized in the report:

1. Manpower and man-hour planning can best be accomplished by integration of staff concepts with line expertise;
2. Some locations have personnel surpluses, whereas others have personnel shortages; and
3. Uniform increases in personnel and money are viewed with disfavor because of widely disparate man-hour and employee needs in relation to the objectives to be accomplished.

## APPENDIX B

### SYNOPSIS OF THE FAIRFAX RESIDENCY PILOT AREA STUDY

The head of the personnel division and the Culpeper District Engineer requested the assistance of the Highway Research Council and the staff of the department's personnel division in conducting a manpower planning study of the maintenance activity within the Fairfax Residency.

The study was initiated in March 1970. The objectives of the study were (a) to develop realistic ways in which the maintenance work load could be anticipated in terms meaningful to manpower planning and (b) to determine the personnel needed to meet the work load.

In conducting the study, the researchers were given the opportunity to study manpower planning not only in terms of numbers but also in terms of the Fairfax management process. The suggestions for change are therefore greater in scope than those resulting from previous manpower studies.

#### Scope of Study and Recommendations

1. Because of the limited time allotted, the study was primarily restricted to manpower planning and management analysis of the maintenance functions of the Fairfax Residency and therefore should be viewed in that context.
2. Because recommendations beyond the residency level are viewed as beyond the scope of this study, considerations of the "districtization of Fairfax" have been omitted. It should be noted, however, that Fairfax's man-hours, expenditures, and equipment are approaching the levels of some of the department's districts and that any widespread area splitting will have a serious effect on the effectiveness of the traditional residency organization. The organization was altered prior to this study, and it will be altered further if the recommendations of this study are followed.
3. A truly complete manpower planning study covers and integrates manpower, equipment, and financial planning. This study has ignored financial planning because it involves the department's fund allocation process, which is beyond the purview of the researchers; when, however, manpower planning is implemented on a department-wide basis, manpower, equipment, and financial considerations will have to be integrated to achieve optimum solutions.
4. It is suggested that, in the future, the return on the department's invested dollar should serve as the criterion for the integration of manpower, equipment, and financial plans.

#### Restructure of the Maintenance Management System

1. The department's maintenance management system in Fairfax was restructured to more adequately meet the management analysis and planning needs of Fairfax (and other urban areas).

2. The system restructuring included the addition of many important functions, such as the cleaning and repair of minor drainage, curb and gutter maintenance, litter patrol activities, sidewalk maintenance, and maintenance replacement, to the planning process. The restructuring has resulted in planned man-hours for approximately 80 percent of the residency's activities as opposed to current man-hour plans that account for only 45 percent of the man-hours expended. All residency crews were included in the man-hour planning.

3. The restructuring was performed primarily by the Fairfax Residency staff. This has resulted in the management-by-objectives training of the staff and the acceptance and active use of the maintenance management system—a situation that did not exist at the time the study was initiated.

4. The manpower plan developed by Fairfax calls for a manning level of 472 persons (including convicts) to meet current needs. The researchers consider this level reasonable, providing that current productivity standards continue.

#### Effective Manpower Management

1. It is recommended that, with increased productivity, Fairfax's current manning need and authorization should not be 472 but rather 415 (35 more than the 380 on the residency payroll as of April 15, 1970). The Fairfax labor force as of October 1970 was approximately 415.

2. The residency thought that personnel increases should be achieved through the use of additional highway employees rather than convicts because convict labor already represented more than 25 percent of the work force. The researchers agree with the residency on this point.

3. It is suggested that the increased productivity called for can be accomplished through the following: (a) More effective delegation of authority, responsibility, and accountability in the residency than currently exists; (b) continuous efforts toward utilizing as effectively as possible equipment such as graders, loaders, rollers, sweepers, and tractors; (c) further automation of residency maintenance functions where feasible; (d) the provision of 2 additional maintenance management positions (1 residency maintenance supervisor and 1 residency equipment supervisor) to help ensure that the previous steps are accomplished effectively (the need is for more and better management but less labor than had been anticipated); and (e) the possible addition of 2 high-level maintenance positions (2 assistant resident engineers for maintenance) that the residency feels are needed (the researchers are inclined to agree that additional assistants may be needed, but it is suggested that, prior to final action, the requirements of these positions be examined in greater detail).

4. Because of the great urban demands on the Fairfax area, a management-by-crisis situation has been created and not yet resolved. This situation has resulted in each level of management performing 1 or 2 levels below its position; therefore, the functions of the highest level either have not been accomplished or have been performed on an unsystematic basis.

5. It is recommended that all area superintendents report to their residency maintenance supervisors only and that these supervisors have the authority to plan, execute, and implement the maintenance functions of the areas or the crews for which they are responsible. Because of this increase in informal authority, supervisors should be held more accountable than they have in the past for the results achieved in their areas.

6. It is suggested that, along with increased quality and quantity of management, more attention be paid to the higher level maintenance activities of long-range planning, development of improved management techniques, more effective ways of implementing public relations activities as they affect operations, and examination of questions such as the utilization of equipment on hand as well as possibilities for future automation.

7. Area superintendents appear to have sufficient authority, but it is felt they are not held as accountable for the results of their operations as might be desirable.

8. The Fairfax effort toward encouraging highway foremen to assume responsibility for subareas is commendable and should be applied on a residency basis. It is also suggested that the question of optimum numbers of man-hours per foreman should be

examined in some detail by residency management. Currently, Fairfax annually expends an average of 19,800 hours per foreman. There is a wide range of hours expended among areas.

9. In order for manpower planning to be implemented on a continuous basis in the residency, the personnel supervisor must take an active part in manpower planning.

#### Equipment Utilization, Automation, and Manpower Planning

1. Because maintenance needs will continue to grow (particularly in urban areas), efforts should be made to evaluate the possibilities of maximum use of automation to carry out the maintenance functions of the department.

2. These possibilities should be viewed in terms of the following: (a) effective utilization of equipment such as graders, loaders, rollers, sweepers, and tractors, and (b) the introduction of new equipment (where technically and economically feasible) that can perform functions that are now performed solely by men, e.g., the cleaning of catch basins and the conduct of litter patrols. The modification of old equipment might also achieve this.

3. Currently, on the basis of hours used only, rental equipment does not appear to be used as effectively as it might be; however, this can be caused by equipment obsolescence, breakdowns, delay in delivery of parts, and information needs as well as equipment management at the residency level. Residency equipment, therefore, should not be called in nor should residency requests for additional equipment be held up. It is suggested, however, that Fairfax and other residencies be provided with information relating to hours used, hours broken down, and equipment profitability on a quarterly basis so that the residency can schedule usage and repair of equipment as effectively as is possible.

4. Another measure that should provide incentive for effective equipment management would be to charge in some form an "availability" fee on equipment. (District equipment rental rates have since been instituted along with utilization standards by equipment class. Estimated annual savings since implementation of these recommendations are \$466,000.)

5. Optimum equipment utilization and manpower planning trade-offs (automation versus people) should be given primary emphasis by the assistant resident engineer for maintenance, the residency maintenance supervisors, and the equipment and maintenance divisions. The trade-offs should be designed under the supervision of a person or committee that possesses the authority of implementation because they will dictate the future effectiveness of the department's maintenance operations.

6. The introduction of new equipment to automate additional maintenance functions should be viewed by the department and Fairfax in terms of an offensive strategy. The strategy could be the responsibility of the purchasing committee referred to in the department's self-study and could include a separate study on automation possibilities by the research council. In any event, it should receive emphasis by high-level maintenance managers of the residency.

#### Residency Organization

1. As has been stated, it is suggested that additional management positions should be established in the Fairfax Residency. If the 4 new organizational positions are established, the Fairfax Residency should be held accountable for the elimination of much of the management-by-crisis situation that currently exists in maintenance work.

2. Currently, the Fairfax Residency has 9 maintenance areas and 4 crews; residency maintenance supervisors pay little attention to these crews. It is suggested that this inattention is justified because of the present responsibilities of the 2 supervisors (1 has 4 areas and the other has 5); however, management planning and direction (at the lowest possible level) should be given to the maintenance superintendents of these crews.

3. In addition to the need for increased management of residency crews, there is a need for the scheduling of maintenance contract work (\$1.5 million annually) and supervisory inspection of the same and for the supervision and quality control of the activities of the equipment shop.

4. It is suggested that the needs outlined in the previous two recommendations can be met by (a) the addition of a residency maintenance supervisor who would have authority, responsibility, and accountability to the assistant resident engineer for maintenance in the performance of the electrical, sign, construction, and bridge crews and the scheduling and inspection of maintenance contract work and (b) the addition of a residency equipment supervisor responsible for the operations of the equipment shop.

5. It is also suggested that Area 8 (Van Dorn) be split into 2 areas because current plans for this area call for expenditures of more than 137,000 man-hours. This is nearly twice that of any other area in the Fairfax Residency and, for example, more than twice that of any area in the Staunton District. All of the foregoing findings and recommendations relate to the current situation (with implications for the future, of course), but possibilities of additional areas of interest exist for the future—particularly those approaching annual requirements of 100,000 man-hours.

## APPENDIX C

### DESCRIPTIONS OF THE METHODS OF ESTIMATION OF SAVINGS GENERATED BY MANPOWER PLANNING STUDIES IN THE VIRGINIA DEPARTMENT OF HIGHWAYS

1. The revision of established guidelines for determining the number of inspectors that are assigned a given construction project.

Action required: Executive

Status: Fully implemented

Comments: The manpower planning section of the personnel division in cooperation with the construction division and field personnel has developed an analysis of inspector needs and requirements. Staffing analysis will be a continuing program; the management-by-objectives approach has led to a reduction of 108 inspectors. This reduction has been or will be accomplished through normal attrition and/or transfer—no employee will be dismissed for manpower reduction purposes.

Fiscal effect:	<u>Fiscal Year</u>	<u>Estimated Savings</u>
	1971-72	\$ 907,200
	1972-73	907,200
	1973-74	907,200
	1974-75	907,200
	4-year total	\$3,628,800

Documentation

of savings: The reduction of 108 inspectors (who earn an average annual salary of \$8,400) will result in an estimated annual savings of \$907,200.

2. The reduction of the number of employees normally assigned to miscellaneous unmeasured highway maintenance.

Action required: Executive

Status: Fully implemented

Comments: The thrust of this recommendation calls for better utilization of an improved maintenance standards system. On May 19, 1971, a 3-man committee appointed by the Highway Commissioner (2 members of the Highway Commission and the Management Services Officer of the Virginia Department of Highways) issued its report to the Commissioner stating that "The Department has reviewed and expanded man-hour work standards as recommended by the Governor's Management Study team. For the coming fiscal year there will be 45 activities covered by work standards as compared to the 12 in

existence at the time the Governor's Management Study team made its comparison. . . the specific activities for which man-hour standards have now been developed will account for more than 90 percent of the total expenditures for ordinary maintenance."

Fiscal effect:	Fiscal Year	Estimated Savings
	1971-72	\$1,650,000
	1972-73	1,650,000
	1973-74	1,650,000
	1974-75	1,650,000
	4-year total	\$6,600,000

Documentation of savings: Any reduction of costs below a normal 5 percent increase as well as the percentage increase of lane miles were counted as unit-cost savings.

Exhibit I: An analysis of estimated unit-cost savings on total ordinary maintenance allocations.

1970-71 allocations (5 percent)	\$2,433,268
Actual increase in allocations from	
1970-71 to 1971-72	<u>1,154,469</u>
Difference	\$1,278,799
1 percent primary 1970-71 budget	
(as 1 percent increase primary lane miles)	161,484
4 percent interstate 1970-71 budget	
(as 4 percent increase interstate lane miles)	<u>205,802</u>
Total estimated maintenance unit-cost savings	\$1,646,085