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<p>16. Abstract</p> <p>MAINTENANCE ACTIVITIES: This part of the overall Study was accomplished through the following sequence of activities: (a) data collection and evaluation for four types of routine maintenance projects (seal coats, guardrail repairs, rest area maintenance and pavement marking); (b) identification of project characteristics affecting contractor and in-house projects; (c) evaluation of cost components for in-house projects (direct, overhead, building-use, insurance, downtime) and for contractor projects (bid price, administration, supervision). Results obtained are based on 403 projects conducted at six selected Districts.</p> <p>MOWING, HERBICIDE SPRAYING AND LITTER PICKUP ACTIVITIES: The analytical method used in this part of the Study consists of four basic activities: (a) identification of relevant factors, benefits and costs; (b) examination of changes in mowing practices and costs on the basis of data for 13 Districts and SDHPT computer files; (c) cost-comparisons of contracting versus using in-house forces, using mowing cost data from a selected sample of road sections in 13 Districts and generating litter pickup cost differentials between the two strategies; (d) benefit and cost analysis of a pest plant control program on the basis of data collected from secondary sources and SDHPT.</p>			
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COST EVALUATION PROCEDURES CONCERNING THE USE
OF CONTRACTORS AND STATE FORCES IN ROUTINE
MAINTENANCE AND MOWING PROJECTS

by

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ABSTRACT

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KEY WORDS

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DISCLAIMER

The contents of this report reflect the views of the authors who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration or the State Department of Highways and Public Transportation. This report does not constitute a standard, specification, or regulation.

Cost Comparison of Maintenance Activities
and a Selected Cost-Benefit Application

Summary Report 2-18-86-380

This study was divided into two major phases. The first phase, documented in research report 380-1F, Vol. I, focused on maintenance costs for projects including seal coat, pavement marking, guard rail and rest area activities. The second phase, documented in Research Report 380-1F, Vol. II, evaluated mechanical mowing, herbicide spraying and litter pickup practices and costs.

OBJECTIVES

The objectives of this Study are grouped into two categories according to the two-phase nature of the project:

Maintenance Activities

1. Identify significant factors affecting routine maintenance project costs.
2. Evaluate costs for State forces (direct and indirect) and contractors (including SDHPT supervision and administration) for six selected SDHPT Districts.

Mowing, Herbicide Spraying and Litter Pickup Activities:

1. Determine all the factors, benefits, and costs that should be considered in comparing different right-of-way mowing and vegetation control practices.
2. Determine the dollar benefits and costs of different mowing frequencies and practices.
3. Determine the benefits and costs of in-house and contract mowing and litter pickup operations.
4. Explore the possible benefits and costs of implementing a Johnson grass or pest plant control program.

STUDY METHODOLOGY

Maintenance Activities

This part of the Study was accomplished through the following sequence of activities: (a) data collection and evaluation for four types of projects: seal coats, guardrail repairs, rest area maintenance and pavement marking; (b) identification of project characteristics affecting contractor and in-house

projects; (c) evaluation of project costs for in-house and contractors on the basis of a selected sample of projects located in six Districts.

Mowing, Herbicide Spraying and Litter Pickup Activities

The analytical methodology used in this portion of the Study consists of the following activities: (a) identification of relevant factors, benefits and costs; (b) examination of changes in mowing practices and costs on the basis of data for 13 Districts and SDHPT's computer files; (c) cost-comparisons of contract versus in-house projects: mowing cost data were collected from a selected sample of road sections in 13 Districts; litter pickup cost data were collected on a limited number of highway sections and used to generate a cost per acre differential between in-house and contractor strategies; (d) benefit and cost analysis of a pest plant control program: data were collected from secondary sources and SDHPT.

CONCLUSIONS OF THE STUDY

The primary conclusions that can be reached from this Study are as follows:

Maintenance Activities

(1) Seal Coats: There is evidence that the use of contractors is more economical in all Districts. When a more homogeneous comparison is made on the basis of type of materials used, the advantage of choosing the contractor's option becomes more apparent. However, more data are required before a sound conclusion can be made. The selection of an optimal mix of in-house and contractor projects could be investigated if more data were available.

(2) Pavement Markers: It is not possible to conclude that a single alternative (State forces or contractors) is more economical, since the cost for the contractors is a state-wide average while in-house costs are averages computed for each of six Districts. Additionally, the number of miles striped and buttons placed are rough estimates for some Districts. On the basis of the data available there is not a clear cost advantage of using either alternative. More Districts should be included in the analysis to have a more meaningful comparison.

(3) Guardrail Repair: For this activity the choice of contractors is more cost-effective. The difference between the two options ranges between \$4.26 and \$6.82 per linear foot. The data for this activity were very limited for the in-house projects. More Districts must be included and more data collected for the analysis of this activity in order to have more reliable costs for State forces.

(4) Rest Areas: The results from the Study suggest that it is more cost-effective to use contractors to maintain rest areas. The average cost computed for the three Districts included in the comparison is about 34.7% higher than the average calculated for contractors.

Mowing, Herbicide Spraying and Litter Pickup Activities

(1) There are several factors that significantly affect mowing costs, primary among them being the amount and cost of contracting and the extent of herbicide spraying to control Johnson grass. Others are acres mowed, number and type of mowing cycle, crew size, volume of traffic, urban/rural location, SDHPT District, soil type, and vegetation area of the state.

(2) Contract mowing is considerably more cost efficient than in-house mowing.

(3) Contract litter pickup is also considerably more cost efficient than in-house litter pickup.

(4) The overspraying programs in the three study Districts are already producing net savings in mowing costs.

(5) The overhead cost estimates for the mowing, litter pickup, and herbicide maintenance functions may be somewhat low due to the method used to make such estimates.

(6) Most of the 13 Districts surveyed indicated that reduced mechanical mowing would increase overspraying operations and that such an effect would be cost-effective. Also, all 13 Districts indicated that increased contract mowing was an acceptable alternative to in-house mowing, and 75 percent indicated that such action would be cost-effective.

RECOMMENDATIONS

The following recommendations are made to the sponsor of this Study:

Maintenance Activities

1. Develop an extensive database including all Districts and all important maintenance activities. Emphasis should be put not only on costs but on quantities of materials used and amount of work accomplished on each activity.
2. Extend the analysis of project costs to complete important aspects of the research, such as quality, complexity, time of completion (delays), and overhead costs.
3. Investigate the use of set-aside programs.
4. Investigate the selection of an in-house/contractor project mix that would minimize total SDHPT routine maintenance expenditures.

Mowing, Herbicide Spraying and Litter Pickup Activities

1. Give the three study Districts more time to perfect their overspraying programs by allowing them to cut further back on mechanical mowing.
2. Perform a detailed evaluation of contracting procedures to reduce chance of defaults.
3. Determine a reasonable level of in-house backup personnel and equipment to have on hand in case of a default.
4. Determine other feasible alternative actions to take besides using an in-house backup crew in case of default.
5. Continue study of overspraying program to more clearly establish its cost-effectiveness in various parts of the State.