

## **MAINTENANCE MANAGEMENT IN OREGON**

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When the then Oregon State Highway Division was organized in 1917, the accounting record system was set up in such a manner that only minor changes have been necessary during the past 54 years. The system has never required major revision. The basic management program is one of administrative staff, regional, and district control.

The last revision to geographic regions and districts (in 1968) was made to conform to a district planning concept covering all phases of state government, both planning and administration. Again, the district boundaries required only minor adjustment.

The state is now divided into five regions. The regions are further subdivided into districts. This basic control pattern has been further broken down by areas. Each county has a number, the numbers progressing consecutively through the alphabetical listing of the counties. As the highway system evolved, each highway was given a special record number, not connected with any federal, state, or map route number. Each of these highways was mileposted. Within each of these countries, control sections were established on each highway.

The control section numbers on primary highways start with 1; on secondary highways they start with 61. In assigning maintenance and minor betterment costs to a particular section of highway, we use a numerical prefix. The control section number is preceded by a number indicating the type of work. Number 12 is used for minor betterment, and number 44 is used for regular maintenance. Each item of work is further identified with a suffix that denotes the class of work involved. These items are broken down into nine major classes of work. With this basic code, it is then simple to indicate on documents the proper recording of any item of work.

The coding system provides for directly charging all labor and materials to the highway section to which it was applied. The payroll system and the payroll report system require that the function numbers for each hour of labor be correctly affixed. The same is true of materials. Each item that is purchased is paid for only after the proper accounting number has been affixed to the invoice. This system is used whether the item being purchased is a 5-cent bag of nails or sanding material worth \$250,000.

Once labor and material costs are accounted for, the proper distribution of equipment costs must be determined. As stated earlier, each piece of equipment purchased is given a number that indicates year, model, and type of equipment.

The vehicle number is indicated on the invoice for gasoline, tires, maintenance labor, or any other item that is purchased for that piece of equipment on the vehicle. The initial cost is also recorded. Thus, the purchase cost and the maintenance of the equipment are charged against the individual equipment. This equipment and its use must be accounted for by a monthly equipment report showing sections on which it was used. Each fleet is given a fleet code number, and a daily rental rate is established for each vehicle.

With this basic system, an accurate accounting can be made of the labor and materials and equipment going into each predetermined section of the highway.

Let us now turn to control. The total budget for maintenance and planned activities is established by administrative judgment. The judgment, particularly with respect to general maintenance, becomes a question of policy: Do we wish a more concentrated effort on certain items of maintenance such as roadside cleanup, or do we want increased snow and ice control? After those judgments have been made, a budget is prepared based on manpower, equipment, and material needed to sustain the program

at the desired level. The budget is then submitted to the proper authorities (in our case the state legislature) for approval.

After approval, the budget is reworked by the maintenance staff and allocated to the regions and in turn subdivided among districts based on four factors: (a) vehicle ton-miles, (b) lane-miles of highway, (c) experience, and (d) snow-removal cost. Snow-removal funds are allocated first to the regions and districts based on past experience. The remaining funds are then subdivided by a formula using 50 percent for vehicle ton-miles, 25 percent for lane-miles of highway, and 25 percent by experience cost over the past 3 years. The experience factor covers the allocation of additional moneys to sections subject to slides or lesser moneys to sections that have neither brush-cutting nor slides. Each district engineer then becomes responsible for his budget to the regional engineer; each regional engineer in turn is responsible to the central staff for the budget for his region.

The central staff must then provide guidance and control. For control, the staff uses a bi-monthly report covering expenditures to date, budget, and percentage spent. This report is normally furnished within 15 days after the close of the period. Another report covers the same time period and further breaks down the expenditures into nine maintenance categories showing the percentage of that district's total budget that has been spent on the specific items in question. Both reports show the total amount of effort being expended by the district and where the effort is being applied. A third report further pinpoints the area of effort. The specific jobs on each specific control section are detailed in this report, and the particular cost of any one piece of work can be determined at any time. We feel that constant surveillance of these reports at district, region, and staff levels has provided a method of control to indicate the precise location and amount of maintenance effort being expended.

In addition to the budget reports, a monthly summary of the manpower assignments for each crew is supplied to the maintenance section. Each crew has a number permanently assigned to it and a permanent complement of personnel that may vary from summer to winter. The report indicates the number of positions filled at any time. These positions are the permanent civil service positions, and no district or regional engineer has the authority to exceed these complements without approval by the Position Review Board. He does have the authority in case of emergency to hire personnel as required under an emergency or on a temporary basis. This report also lists the name, retirement number, position number, and social security number of every man on the payroll.

Another payroll report is made basically for management. It lists, by various classes of work, the number of employees on the payroll for the past month during the current year and also the preceding year, the number on the payroll for the immediate month, and the amount of regular and overtime work. Another report pinpoints the overtime expended by various crews and by various men.

The several reports used for equipment control are as follows:

1. A listing by vehicle type of the number of units of each model owned;
2. A listing of the crew number, location, and number of vehicles of each type assigned to that crew;
3. A summary listing by types of vehicles of crew, individual vehicles assigned to that crew, mileage of hours for that vehicle, and number of shifts the car was used, cost per mile both for the preceding month and for the past 12 months, total mileage that the equipment has been operated throughout its life, and total cost of maintenance and upkeep;
4. Status of all equipment by fleet including miles per month, shifts, total rental income, and total cost of the equipment both for the 12-month period and for the entire life of the equipment. (The report provides the equipment superintendent and his staff sufficient data to analyze equipment fleet utilization and cost both by fleet and by manufacturer, identifies by each individual unit equipment requiring major maintenance, and recommends appropriate action such as sell or repair);
5. A listing of maintenance costs only, broken down into nine categories: preventive maintenance costs, tires and tubes, engine, power train, electric components, air and hydraulic components, axle and suspension gear, body and chassis, and miscellaneous

(proper analysis of this report is an aid in the preparation of the specifications for future equipment acquisition and permits identification of components that have proved to be costly); and

6. A listing that summarizes throughout the total life of each piece of equipment the acquisition, depreciation, maintenance and operating costs, sale price received, total rental receipts, and total ownership cost.