Appendix F: Evaluation and Performance Measurement

The process of developing goals, objectives, and performance measures can help departments evaluate and measure the level of service they provide. Goals are the general ends toward which departments direct their efforts. Objectives are measurable statements about the results that departments expect to achieve in a given period of time. Performance measures are quantifiable indicators that assess the actual impact of a department's programs.

PURPOSE

Measures of performance provide quantifiable information on an organization's impact, efficiency, and effectiveness. They allow department officials to make better, more informed decisions about service delivery. Performance measures can show what value a department is getting for the dollars it spends on winter maintenance. Departments that evaluate their snow and ice control performance over time can track both achievements in service delivery and areas needing improvement. Systematic performance evaluation can also justify spending requests by demonstrating real maintenance needs of the road system. Moreover, information obtained from measuring a department's efforts and accomplishments can improve communication with elected officials and the public by focusing on the actual results achieved instead of perceptions.

DEVELOPING PERFORMANCE MEASURES

Collecting information on performance allows a department to compare winter road maintenance against baseline data. For example, a department can compare the cost of its snow and ice control across districts, geographic areas, or over time (year-to-year or month-to-month). Once a department sets goals or adopts standards, performance information can tell officials how well a department is meeting those goals or what additional resources may be needed. Only by systematically reviewing how well it meets its goals and objectives can a department identify practices that improve its service.

This appendix provides a sample of performance measures that departments can use to measure and report the efficiency and effectiveness of its snow and ice control. These measures are a guide for departments to evaluate their performance. Departments should consider the examples below to be a menu from which they can select measures most useful for their individual needs. However, agencies need not feel limited to the measures listed here and can develop others appropriate to their particular circumstances.

Performance measures may include measures of inputs, outputs, outcomes, effectiveness, or efficiency. We describe these below.

Inputs

Input measures are the resources used to provide a particular service or activity. Collecting basic information on snow and ice control operations is the first step to developing meaningful performance measures. Examples of input measures for snow and ice control include:

Labor Hours

- Regular and overtime hours,
- Full-time and part-time hours, and
- Contract hours.

Equipment Hours

- Vehicle hours (by type), and
- Attachment hours (by type).

Material Usage

- Type and amount of material used.

Expenditures

- Material costs,
- Equipment costs,
- Labor costs,
- Contract costs,
- Administrative costs,
- Damage repair costs, and
- Spring road sand recycling costs.

Outputs

Output measures indicate the number of units produced or services provided by a department or its programs. Specific output measures related to snow and ice control can include the following, although not all examples will be applicable in every jurisdiction:

- Number of plowing and sanding operations (responses),
- Number of responses by type of storm,
- Number of lane miles plowed and sanded,
- Number of routes (primary and secondary) plowed or sanded,
- Number of cul-de-sacs, alleys, or miles of sidewalk plowed and sanded,
- Number of damage repairs (*e.g.*, mailboxes, sod) completed, and
- Number of requests or complaints answered.

Other indirect output measures include:

- Number of items damaged while plowing or sanding,
- Number of requests or complaints,
- Number of parking violations, and
- Number of accidents.

Outcome Measures

Outcome measures indicate the actual impact of a department's actions. Examples of outcome measures include the percent of roads plowed per storm response or the percent of residents satisfied with snow and ice control services. Outcome measures are the effects of the department's actions on its customers.

Effectiveness and Cost-Effectiveness Measures

Effectiveness is a measure of how well the job is done. It is a measure of input per unit of outcome. Effectiveness in snow and ice control measures the extent to which winter maintenance departments achieve their goals and meet their objectives.

Cost-effectiveness measures indicate the capacity to produce desired results with a minimal expenditure of time, energy, money, or other resources. Assessing cost effectiveness allows departments to determine whether there are other ways of achieving their objectives with the same effectiveness but with lower costs, or higher effectiveness at the same cost.

Efficiency Measures

Efficiency measures indicate the value of the work a department produces. In other words, a measure of efficiency is the cost per unit of output. Examples of efficiency measures include the average cost of snow and ice control per: storm response, type of response, route, or lane mile. Departments can also break down their total costs into individual components, such as the costs for operators, equipment, materials, and repairs. If departments want more detailed information, they can further subdivide those cost components by type. For instance, departments can distinguish between full-time or part-time operators, or divide materials into salt, sand, or calcium chloride. The more specific the measure, the better a department can isolate the efficient and inefficient elements of its snow and ice control operation.

Examples of Snow and Ice Control Performance Measures

The following are examples of possible goals, objectives, and performance measures for departments' snow and ice control. This list is not exhaustive, and presented only as an illustration of possible evaluation measures available to departments. Individual departments should select measures that are appropriate for their own set of goals and objectives.

Goal: To plow snow and ice off the roads in a timely manner.

Objectives: To plow snow and ice from all priority roads in "X" hours, and from all other roads in "X" hours.[1]

Measures: Average time to plow or sand routes (total labor hours to plow or sand / total number of routes);

Average time to plow or sand routes per: storm response, storm type, lane mile, operator, and crew or shift; and

Average plowing or sanding start time (difference between time snow event began and time plowing or sanding action began / total plowing responses).

Goal: To satisfy the public's need for safe winter travel.

Objectives: To reach partially bare pavement within "X" hours of the storm.

To reduce the number of accidents and complaints from snow and ice covered roads by "X" percent each year.

To decrease the response rate for requests/complaints and accidents by "X" percent each year.[2]

Measures: Total number of lane miles plowed or sanded within "X" hours as determined for the department's recommended level of service per: storm response, storm type, and route;

Average request or complaint response time (difference between time complaint registered and time complaint answered / total number of complaints); and

Average accident response time (difference between time accident reported to department and time department responds (when appropriate) / total number of accidents).

Goal: To maintain an effective parking policy.

Objective: To reduce the number of parking violations by "X" percent each year.

Measure: Total number of parking violations or vehicles towed per: storm response, storm type, and route.

Goal: To mitigate damage caused by snow and ice control activities.

Objective: To reduce the damage caused by snow and ice control activities by "X" percent each year.

To decrease the response rate for repair damage by "X" percent each year.

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1 We use "X" to designate information jurisdictions would fill in based on their own level of service.

2 The response rate measures the time required for a jurisdiction to respond to an event such as a complaint, accident, or storm.

Measure: Average damage response time (difference between time of damage report and time report answered / total number of damage reports).

Explanatory Data and Background Information

Other explanatory data that may provide useful background information to departments or help them evaluate their effectiveness and efficiency include:

General

- Date, day, and time of recording,
- Individual completing form, and
- Unit/vehicle/equipment number.

Equipment

- Time of use,
- Activity, and
- Mileage (when appropriate).

Materials

- Conditions for use.

Operators

- Start and end time.

Damage

- Date and type of item damage,
- Route and operator, and
- Date and type of repair.

Storm Condition

- Temperature,
- Type and amount of precipitation, and
- Other weather conditions.

Response

- Full or partial call-out,
- Time crew contacted and time crew arrives,
- Shift filled (day/night or 1st/2nd/3rd),
- Time storm event starts and ends, and
- Time response activities start and end.

Violations of Parking Restrictions

- Date, location, and type of violation.

Accidents

- Date, location, and type of accident,
- Vehicles involved, and
- Department response.