

Performance Measures in Snow and Ice Control Operations: Operational Objectives. NCHRP Report 889

There is a direct correlation between an agency's mission and goals, their operational objectives, and performance measures. It is useful for agencies to review their mission and goals statements in relation to effective snow and ice control because these constitute a large part of an overall mission of safe, reliable and sustainable operations. Operational and maintenance objectives are created in order to achieve the stated mission and goals. Agencies need to create a means of measuring the achievement of their objectives. The achievement of these performance standards becomes the primary performance measure for an agency. The operational objectives then set performance standards which in turn drive performance measures.

The NCHRP report singles out seven outcome related operational objectives and identifies seven supporting performance measures. Here we are going to outline the seven operational measures.

LOS (level of service), Recovery, Reliability, Safety, Customer Satisfaction, Efficiency, And Environmental Stewardship are the seven operational categories and the report recommends that outcome-related operational objectives should be defined within these categories.

LOS During Event. Operational objectives in this area correspond to maintaining travel during an event at an acceptable level. There is going to be variability in "acceptable" levels based on the type of both roadway and agency. It is important for agencies to create LOS objectives for during an event because it establishes an expectation based on severity and road type based on the goals set by the agency. Also, if contractors are used, it allows for monitoring of the response quality more efficiently.

Recovery from Event. This objective focuses on the time it takes an agency to recover from the event to normal conditions. The challenge here is objectively defining what is meant by "recovery" or is a return to normal. The achievement of the condition can be measured in the following ways:

- ❖ Return to normal or specific pavement conditions (reported by field personnel).
- ❖ Return to normal or pre-event roadway friction/grip factors.
- ❖ Return to normal speeds as measured by sensors or probes. What constitutes normal speeds should factor in variable speed limits, where applicable, or historical data should be considered in their definition.

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Reliability During Event. This tries to determine an acceptable drop in travel time reliability due to snow or ice. Reliability based operational objectives may be used to focus on priority trips/corridors and periods during snow and events. The measure can be used for understanding trip-level impacts on key corridors and periods. Time travel data can be obtained from: NPMRDS <https://npmrds.ritis.org/analytics>

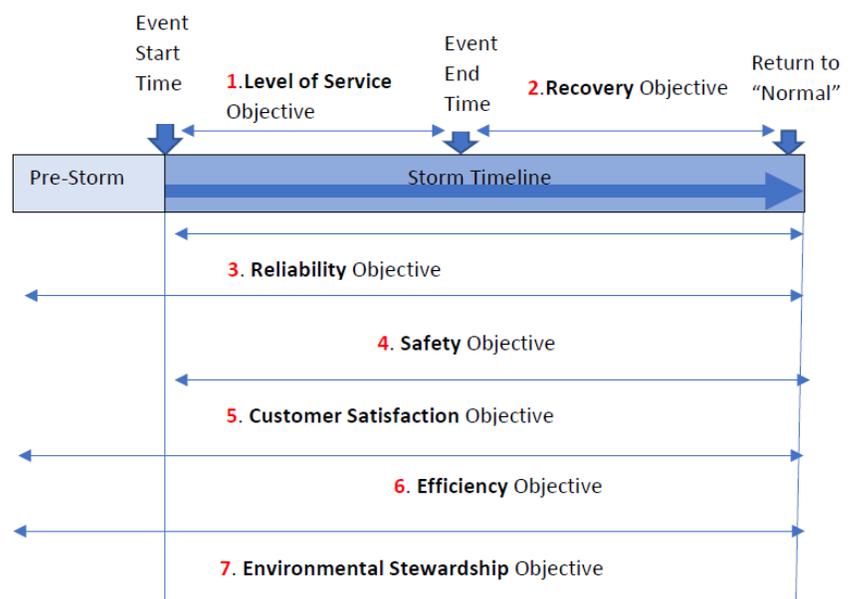
Safety-Related Objectives. The goal here is to improve safety and reduce the risk of fatal crashes for all transportation system users amidst adverse weather. Crash data can provide insight into the success of snow and ice control operations. Objectives related to fatalities and serious injuries are consistent with MAP-21 Safety Performance Management Measures Final Rule. Agencies are expected to develop methods to calculate the measures annually and to set targets.

Customer Satisfaction. Getting feedback from customers is a valuable assessment measure as it enables agencies to better understand the needs of travelers in moments of crisis and can be used to measure the impact of current and future operational practices. Direct customer feedback can help in ensuring support for snow and ice control operations. With the use of apps and smartphone technology customer feedback is becoming more efficient and cost-effective.

Efficiency-Related Objectives. There is an economic impact of winter maintenance both from an agency and user perspective. For the user this takes the form of safety and mobility issues such as crashes and unexpected delays this is especially true for the freight industry. Road closures can help agencies avoid elevated incident costs. Agencies are more likely to have efficiency related objectives that help ensure the cost of maintenance is consistent with the severity of a storm.

Environmental Stewardship-Related Objectives. Materials used in winter maintenance have significant environmental impacts, which can be managed through the appropriate use of salt. There are many studies on the impact chlorides have on flora and fauna and there are studies that clearly show the use of such chemicals reduces the number of accidents in a winter event. The report suggests agencies model and benchmark salt usage based on historical trends and severity as this can be tied to the level of salt use as dictated by the model.

These seven objectives can be measured and reported, they also cover pre-storm preparations, during-event conditions, and post-event recovery. The report links these operational objectives to performance measures, which is the topic of a separate one-pager.



Categories of Operational Objectives.

