SCAN TEAM REPORT
Scan 08-04

Best Practices In Work Zone Assessment, Data Collection, And Performance Evaluation

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Executive Summary

Overview

Current federal regulations (23 CFR 630 Subpart J) encourage states to collect and analyze both safety and mobility data to support the initiation and enhancement of agency-level processes and procedures addressing work zone impacts. States should develop and implement systematic procedures to assess work zone impacts in project development and manage safety and mobility during project implementation. Currently, many agencies have little experience in collecting, analyzing, and utilizing work zone performance data. Those agencies would benefit greatly by learning how other agencies approach these tasks. As a result, a domestic scan of practices pertaining to work zone assessment, data collection, and performance measurement was proposed and selected for funding under the NCHRP 20-68A Domestic Scan Program.

The purpose of the scan was to investigate best practices in work zone assessment, data collection, and performance measurement, and how these practices are being used to ensure safety and minimize congestion in work zones. The scan team identified four main topic area themes to target:

- How does your agency assess the safety and congestion/operational performance of your work zones? In other words, how do you know if your work zones are operating well (i.e., safely, smoothly, and efficiently)?
- How does your agency collect the data for these measures?
- How does your agency use/plan to use the data to make improvements in work zone performance and management?
- What processes, methods, and/or tools does your agency use to assess impacts during various stages of project development (i.e., planning, design, and construction)?

A scan team whose members were from agencies across the U.S. was convened. The team interviewed 15 agencies and developed key findings and recommendations under each of the four topic areas listed above. This report summarizes these findings and recommendations.

Performance Measures Used to Assess Safety and Operational Performance in Work Zones

The scan team found that agencies that have clearly established performance measures tend to effectively track those measures and consider them throughout the project development process. Having clearly established goals and performance measures shows the agency's level of commitment to them. Interestingly, many agencies are using work zone performance measures without realizing it. Most agencies have policies and procedures in place that are based indirectly

on mobility and/or safety performance measures. Overall, work zone safety performance measures tend to be developed and examined mostly at the agency program level, whereas work zone mobility performance measures tend to be developed and examined mostly at the project level.

The scan team recommends that agencies establish specific and measureable work zone safety and mobility goals and objectives. Specific objectives represent the level of commitment an agency is willing to make towards the consideration and mitigation of work zone impacts. The agency's performance measures should then relate to the goals and objectives that it has set for itself relative to mobility and safety impacts.

Of course, performance measures must be established and used rationally. Whereas work zone impacts on the traveling public are key considerations throughout the project development and construction process, they are not the only ones. An agency must also consider costs, productivity, environmental concerns, and other factors. Furthermore, it must be remembered that both the importance of certain measures and the availability of data drive which performance measures a given agency will use. The performance measures an agency most desires may not always be usable because the data needed to compute those measures are not reasonably available.

Data Collected to Compute Work Zone Performance Measures

In terms of data, the scan team found that agencies with good work zone safety and mobility data management systems tend to make better use of the data than those with less structured systems or no system at all. The existence of data management systems also indicated a commitment by the agency's upper management to considering safety and mobility impacts throughout project development and delivery. Electronic crash data entry can significantly speed up the availability of safety data and make it feasible for its use in evaluating ongoing project impacts.

Similarly, the development and implementation of an electronic database system to track and approve current and future lane closures can be very useful to agencies. The database helps to simplify and formalize the notification of the proper individuals and groups within the agency about the closures, and ensures that the closures are performed during acceptable times. The database can also be useful for coordinating multiple lane closures on a given facility or route, can facilitate advance notification of the public, and can assist in targeting monitoring efforts of impacts during the closures. Certainly, Transportation Management Centers (TMCs) play a key role in managing lane closures throughout a region. A TMC has staff and other resources that make it the logical focal point of information collation and dissemination to the public. TMCs are also useful for providing real-time information to drivers when traffic queues develop at a project to encourage diversion and mitigate the magnitude of the queues.

Of course, many work zones occur in locations where TMCs do not exist. Fortunately, the increased availability of low-cost technologies and data sources are making the collection and use of mobility data in work zones more feasible for agencies. The development of highly portable devices further increases the feasibility of data collection in work zones. In addition, many

agencies are obtaining access to third-party mobility data on routes without agency surveillance and control equipment, which is also making work zone mobility data more readily available.

Based on these findings, the scan team recommends that agencies decide what data are required to measure performance; invest the necessary resources to obtain that data; and decide how the measures that are computed will be used to affect decisions or, in some cases, agency processes, for a given project. If a TMC is to play a key role in collecting mobility and safety data for a work zone, it is important that TMC staff be properly trained and procedures established on how work zone data collection, monitoring, and public information dissemination efforts are to occur.

Uses of Performance Measures and Data for Work Zone Safety and Mobility Improvement

The scan team encountered several specific examples of agencies that have been successful in utilizing work zone safety and mobility data and measures to identify deficiencies or gaps in their approach to project delivery and make improvements. In addition, the team found that agency access to real-time safety or mobility data correlates to that agency's ability to modify existing work zones in a timely manner to improve safety and mobility. A lack of timely data (e.g., delays of several months before data for crashes occurring at a project are available or the inability to constantly monitor and quantify the queues or delays occurring at each project) keeps most agencies from being more responsive in improving work zone conditions. Still, it was clear to the scan team that not all agencies have fully explored the availability and usefulness of data for improving work zone safety and mobility. Agencies often cited that a lack of resources (e.g., time, expertise, and other supporting data) was why they were not doing more with the available data.

Therefore, the scan team believes that agencies should strive to ensure that collected work zone safety and mobility data are fully analyzed and utilized to improve agency processes and procedures. This effort may involve bringing in additional data sources, such as work zone exposure data, to allow the performance measures to be normalized across projects, roadway types, work activities, and other project aspects.

Work Zone Impact Analysis and Performance Measures Used During the Project Development Process

Some agencies have realized that the earlier in the project development process that work zone impacts are considered, the better the end product will be. Beginning this process early allows a wider range of options for accommodating work zone traffic to be considered.

Many agencies use capacity analyses, permitted lane closure charts based on capacity analyses, and/or other analytical tools to eliminate or minimize the mobility impacts of work zone projects. Some agencies have developed their own in-house tool that project designers can use to facilitate quick analysis. Agencies also tend to use more-complex modeling tools on high-impact projects in urban areas and are more likely to seek the help of an outside entity (e.g., a consultant or a Metropolitan Planning Organization) on these more-involved analyses.

Therefore, the scan team recommends that agencies clearly define how and where work zone safety and mobility impact assessment fits into their project development process. Doing so increases the chances that these impacts will be better mitigated, the costs will be accounted for, and the project will go more smoothly.

The project development process many agencies follow is highly structured. At a minimum, it is critical to include impact assessment and mitigation as specific steps in the process. However, the most successful agencies will integrate the consideration of impacts throughout their processes, periodically revisiting early assumptions and making revisions and refinements as project development progresses. It is important to scale the level of the project's transportation management plan (TMP) to the level of anticipated impacts.

Agency staff and time resources are extremely limited and continue to be strained further as budgets are regularly cut. As agencies look for ways to continue to streamline their operations and become more efficient, it will be critical that they have improved data from projects and locations that resulted in significant impacts. Agencies will thus be better able to predict which upcoming projects are most likely to cause significant impacts and to identify mitigation strategies that will have the best chance of alleviating those impacts.