

Implementation Report

Montana Weigh-in-Motion (WIM) and Automatic Traffic Recorder (ATR) Strategy

<http://www.mdt.mt.gov/research/projects/planning/wim.shtml>



Introduction and Purpose

Traffic data supports a myriad of transportation related activities, from system planning, to roadway design, to system operation and maintenance. Traffic data typically collected include traffic volume, vehicle classification, and vehicle weight data. In light of its importance, the Federal Highway Administration (FHWA) has established requirements on the development, implementation, and continued operation of a traffic monitoring system for highways and public transportation facilities in each state. Further FHWA has established federal traffic data reporting requirements. Two types of data collection systems are generally employed in continuously collecting these data at permanent sites on a highway network, namely, Automatic Traffic Recorder (ATR) and Weigh-in-Motion (WIM) systems. ATR systems variously collect traffic volume, vehicle classification and speed data, while

relatively more expensive WIM systems also collect vehicle weight data. Data collection coverage across the system is significantly extended by utilizing portable equipment to conduct short term traffic counts at numerous additional sites around the state. Results of short term counts can be expanded to annual traffic usage by applying adjustment factors developed for various traffic factor groups from the data collected continuously throughout the year at permanent ATR and WIM sites.

This project was conducted to comprehensively evaluate the existing Traffic Count Program of the Montana Department of Transportation (MDT) and to provide recommendations for potential program improvements. MDT currently operates 64 ATR and 42 WIM permanent/continuous data collection sites on the state highway network, augmented by over 5,000 short term count locations. The Traffic Data Collection and Analysis (TDCA) Section of MDT is responsible for the data collection program, from installation and maintenance of sensors and ancillary equipment, to

data processing and analysis, to data dissemination. While both short term counts and permanent data collection programs were considered in this study, the focus was on permanent counter (ATR and WIM) programs, with a further emphasis on the WIM program. Consideration was specifically given to data collection equipment/ technologies, the number and location of traffic data collection sites, the types of traffic data collected, data processing and analysis, data presentation and accessibility, traffic data users and uses (both current and future), and program management and operations.

Overall, MDT's WIM/ATR program was found to be efficiently and effectively meeting traffic data needs, both within and outside MDT. That being said, traffic data collection is a dynamic activity, with a) research continually being conducted to potentially improve data collection, processing and presentation, and b) ever changing data user needs/priorities. Based on the study results, several recommendations were made to potentially improve MDT's

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traffic data collection efforts. Each recommendation is presented below, followed by the associated action MDT intends to take in response to the recommendation, as formulated by the technical panel.

Implementation Recommendations

Recommendation 1: The TDCA Section has and should continue to consider various improvements in data collection (especially for urban environments) and processing technologies, notably, as they potentially advance and as data user needs continue to evolve.

Technical Panel Response: MDT will continue to consider any such improvements and evaluate their potential benefits in the context of operating conditions in Montana. Internal MDT testing has already begun using various technologies with a focus on non-intrusive equipment that reduces pavement impacts, increases staff safety, and allows for collection of traffic data in areas not suited to current in-road technology.

Recommendation 2: Work should continue on identifying areas with increased vehicle activity that merit increased data collection coverage to adequately characterize both volume and weight related traffic demands.

Technical Panel Response: MDT will continue to monitor its count program to ensure it accurately represents traffic patterns on both high and low volume roadways. As increased vehicle activity is identified, MDT will determine any associated changes in traffic data collection that are merited. The weighted sum model (WSM) developed in this project for locating/evaluating data collection sites may help in these regards, as it

includes criteria and weighting factors related to both a) areas with increased vehicle activity and b) roadways that are under-represented in the current data collection process. In addition, MDT is moving towards the establishment of traffic data regions across the state based on economic activity, population density, etc.

Recommendation 3: Assessment of the basic structure of the traffic and weight factor groups used by MDT should continue to ensure these groups reasonably represent operations across the highway network. Relative to traffic factor groups, the alternative grouping scheme consisting of a simplified classification of interstate versus non-interstate, and commercial versus non-commercial vehicles developed in this project should be considered.

Technical Panel Response: MDT will consider the traffic factor groups investigated in this project and review the existing groups that are used in light of the recommendations of this research. Specific to commercial versus non-commercial vehicles, the current Traffic Count Database System (TCDS) software may provide this functionality. While not specifically addressed in this project, MDT also is interested in reviewing its weight factor groups, which presently are structured in a similar manner to its traffic factor groups.

Recommendation 4: The site selection/prioritization method developed in this project (WSM model) should be used to improve the objectivity of the site selection planning process. Also, it should be used in the evaluation of the efficacy and possible retirement of existing sites.

Technical Panel Response: MDT definitely sees potential value in

the WSM methodology and will actively explore use of this tool in the prioritization of new sites and in ranking existing sites relative to their possible retirement.

Recommendation 5: MDT should continue its practice of vertical integration of data collection activities within a single administrative section to continue to realize the positive technical and fiscal benefits this brings to the overall program.

Technical Panel Response: MDT will continue this administrative practice and organizational structure.

Recommendation 6: Additional staff and/or seasonal staff may benefit the TDCA Section to ensure critical seasonal field work can be completed each year (e.g., equipment maintenance), and to allow various new operational initiatives to be pursued, such as implementation of an improved equipment database to better support system planning/management decisions.

Technical Panel Response: MDT will consider allocating seasonal data collection staff to assist with critical field work. Relative to pursuing new operations initiatives, such as implementation of an improved equipment database to better support system planning/management decisions, time-saving changes are currently being investigated in present work activities that would allow such new initiatives to be pursued by existing staff.

Recommendation 7: The current pavement condition at sites needs to be better evaluated and routinely documented as it is a critical element in system performance.

Technical Panel Response: MDT will partner with the districts and the

Highways and Engineering Division to establish protocols for exchanging pertinent pavement information on an annual or semi-annual basis.

Recommendation 8: The current database of maintenance, repair, and pavement information at WIM and ATR sites should be improved to better manage these assets.

Technical Panel Response: MDT understands the value this database will provide and, as such, it was a necessary feature when the new software vendor was selected. That being said, to monitor and maintain a cost-effective WIM and ATR program, various system costs at current and proposed levels of program operation need to be evaluated in the context of the benefits each element of the system provides. This project ultimately did not provide a process for quantitatively performing such a cost benefit analysis. In discussions with the research team at the conclusion of the project, it was noted that previous work on the State Truck

Activities Reporting System (STARS) outlined an approach for such a cost benefit analysis (presented in the [STARS Follow-On report](#)). Working with Motor Carrier Services, the feasibility of uploading weight enforcement information to the web-based traffic software to support the STARS cost benefit analysis will also be investigated.

Recommendation 9: Looking toward the future, interest in freight transportation continues to be strong at the federal level, and associated traffic data needs related to freight initiatives should be considered as they become more clearly defined.

Technical Panel Response: MDT will stay abreast of national freight initiatives and any related federal programs that require or encourage collection of additional freight related data. Some such data by their nature may fall outside the scope of MDT's current traffic data collection capabilities and scope (e.g., commodity flow data). Consideration

will be necessary of how this data is to be collected, the resources needed to collect it, and the appropriate entity within MDT to be responsible for its collection and reporting.

Recommendation 10: Interest in travel time data and related performance measures is increasing in general across the motoring public and commercial vehicle operators. MDT should begin investigating how this data can be gathered, disseminated, and used by the appropriate groups within MDT.

Technical Panel Response: MDT will begin investigating how this data and related performance measures can be captured and used within MDT. Similar to the comment on the previous recommendation, data to support determination of travel time and related performance measures is currently not being collected as part of MDT's traffic data program. Consideration will be necessary of how this data is to be collected, the resources required to collect it, and

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