



Methodology Behind Traffic Data Collection and Statistics

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ABSTRACT: The Department of Transportation and Public Facilities (DOT&PF) Transportation Data Program (TDP) is responsible for collecting, processing, forecasting and reporting traffic data to meet federal requirements. It is important to understand the process of data collection to accurately utilize the values produced. The two main aspects of the TDP are the short-term count program and the continuous counting program. Both programs collect vehicle volume, classification and speed data.

The short-term program consists of seven-day traffic counts spread throughout the state designed to provide an accurate coverage map of the entire network of publicly accessible roads. The continuous count program consists of traffic sensors embedded in the roadway that provide year round data on a limited section of the network. Seasonal and axle factors are collected from the continuous stations, and are used to annualize the short-term counts to produce traffic statistics meeting federal requirements and complete plans for future highway programs and financing.

INTRODUCTION

The traffic collection responsibilities of the TDP are a primary duty of three individual Field Offices. The Anchorage Field Office (AFO) is responsible for the collection of data in the Central Region that includes Anchorage, Wasilla, the Kenai Peninsula, etc.. Fairbanks Field Office (FFO) is responsible for the Northern Region that includes Fairbanks, Valdez, Prudhoe, Tok, Cantwell, etc. Juneau Field Office (JFO) is responsible for the South Coast Region that includes Juneau, Ketchikan, Kodiak, etc.

The sheer size and remoteness of the road network presents a challenge to collecting traffic in Alaska. There are approximately 17,000 miles of public roads spread out over 663,000 square miles. Not all of Alaska's communities are interconnected via a contiguous road network, many communities are only accessible via the Alaska Marine Highway System or air service. The environment impacts the ability to collect short term counts and results in an extremely short field season of May through September. The limited collection period combined with the highly seasonal variation in traffic highlights the importance of a statistical process to obtain annualized values.

Traffic data collected is used to meet Federal Highway Administration (FHWA) reporting requirements for the annual Highway Performance Monitoring System (HPMS), Travel Monitoring Analysis System (TMAS), [Traffic Volume Trends \(TVT\) report](#) and the Certified Public Road Mileage (CPRM), [Conditions and Performance Report](#) to Congress and impacts the apportionment received by the State of Alaska. At the state and local levels traffic data is primarily

used in project nomination, project design and to assist other sections during decision-making.

METHODS OF COLLECTION

Short Term Counting Program- The TDP collects approximately 1700 short term (ST) counts annually. Depending on location the counts can be set on a 1- 6 year rotation. These counts are set on the roadway to collect data for a full seven days.

The two main components of the ST program are pneumatic hose counts, and temporary inductance loop counts. Pneumatic hose counts are performed with a pneumatic tube (rubber hose) that is stretched across the lanes of traffic and fastened to each shoulder. One end of the hose is connected to a traffic counter. As vehicles pass over the hose, the impact of the axles is detected, counted and stored in the counter.

Inductance loop are sensors buried beneath the roadway and act as metal detectors to record vehicle traffic as it crosses the sensor. They are connected to a counter in a small cabinet on the roadside.

Continuous Counting Program- The State of Alaska has approximately 130 continuous counting stations (CCS). These stations collect data 24 hours a day, 365 days a year, providing a temporal view of what is currently happening around the state.

TDP utilizes different combinations of in-road sensors such as piezoelectric strips and/or inductance counts and nonintrusive devices such as radar detection for collection at these sites. These sensors are terminated in a cabinet with both electricity and communications enabling remote download of data for the field offices.



The setup of the counts on the road (both ST and CCS) determines the breadth of data we are able to collect at a location. At the most basic level only volume is collected whereas at more optimized sites we are able to collect vehicle classification and speed data in addition to directional volume.

■ ANNUALIZING TRAFFIC VOLUMES

The annual statistic calculation process is an important step to account for factors impacting traffic collection to obtain reportable statistical values such as Annual Average Daily Traffic (AADT), Vehicle Miles Traveled (VMT), etc. AADTs are the most utilized statistic produced by the TDP as it identifies the average volume of traffic for the average day at a specific location. At a CCS station, we calculate an AADT from data that was collected during the reporting year using the American Association of State Highway Transportation Officials (AASHTO) methodology referenced in the Traffic Monitoring Guide (TMG). To bring a ST count from a seven day summer count to an annualize value there are two factors that can be applied depending on the type of count: seasonal factor and axle factor. The *seasonal factor* adjusts the raw count to an annual estimate based on the time of year the count was conducted. Since the Alaskan counting season occurs during the highest travel periods of the year, the adjustments are based on the relationship between the ST count and seasonal factor groups consisting of CCS. The *axle correction factor* is the proportion by which a volume count based on axles (counts from pneumatic tubes) is multiplied to obtain an estimate of the number of actual vehicles. Stations are grouped by similar classification distributions, from both CCS and ST classification counts, to produce axle factors to be applied to the appropriate counts. Other statistical definitions computed during the annual statistics process can be found under the Definitions section of this paper.

■ DEFINITIONS AND ACRONYMS

Annual Average Daily Traffic (AADT)- identifies the average volume of traffic for the average one day (24 hour period) during a data reporting year at a specific location. AADT is different from ADT because it represents data over the entire collection year.

Average Daily Traffic (ADT)- is the average 24 hour traffic volume at a given location.

Continuous Counting Station (CCS)- The location of a counting station that collects for a period of 24 hours each day over 365 days for the data reporting year. These can also be referred to as Automated Vehicle Classifier (AVC), Automated Traffic Recorder (ATR) and Permanent Traffic Recorder (PTR).

Certified Public Road Mileage (CPRM)- an annual report of all public road miles in a State.

Daily Vehicle Miles Traveled (DVMT)- indicates how many vehicles have traveled over the distance of a route, for a reporting year (AADT multiplied by the length of that traffic section).

Design Hour Volume- the 30th highest hour of volume in the design year.

Directional (D) Factor- the percentage of design hour volume flowing in the peak direction.

Federal Highway Administration (FHWA)- an agency within the U.S. Department of Transportation that supports State and local governments in the design, construction, and maintenance of the Nation's highway system.

Future AADT- Forecasted AADT value, typically 20 years, for investment requirements such as future improvement needs.

Highway Performance Monitoring System (HPMS)- A national program that includes inventory information for all of the Nation's public road mileage reported annually.

K Factor- is the design hour volume (30th highest hour) as a percentage of the AADT used to calculate capacity for improvements.

Monthly Average Daily Traffic (MADT)- The calculated average daily traffic volume for a specific month at a given location.

Travel Monitoring Analysis System (TMAS)- A FHWA data program that assists in the collection and analysis of data on traffic volumes, vehicle classification, truck weights for traffic statistics, analysis; it is used for development of policies and regulations.

Short Term Count (ST)- a temporary count taken on a 48 hour to seven day duration for a specific segment of the road.

Traffic Volume Trends Report (TVT)- a monthly report based on hourly traffic count data reported by all States.

Truck %- Percentage of commercial trucks on the roadways. Commercial trucks are defined as classes 4 through 13 in the FHWA's 13-category vehicle classification system.

Vehicle Miles Traveled (VMT)- The total miles traveled on the road network in a year (DVMT multiplied by 365).

Weigh in Motion (WIM)- A measure of the vertical forces applied by axles to sensors in the roadway. This is used to measure the weight carried by trucks.

■ REFERENCES

Highway Performance Monitoring System: Field Manual. U.S. Department of Transportation, Federal Highway Administration, 2016.

Traffic Monitoring Guide. U.S. Department of Transportation, Federal Highway Administration, 2016.