

Section 1

Overview Of The Traffic Monitoring Guide

CONTENTS

<i>Section</i>	<i>Page</i>
CHAPTER 1—OVERVIEW.....	1-1
CHAPTER 2—GUIDE OBJECTIVES.....	1-3
CHAPTER 3—DATA USES.....	1-5

TABLES

<i>Table</i>	<i>Page</i>
1-3-1 Examples of Studies that Use Traffic Characteristics Data	1-6

SECTION 1 OVERVIEW OF THE TRAFFIC MONITORING GUIDE

CHAPTER 1 OVERVIEW

The TMG is intended to be a statement of good practice. It is not to be considered a federal standard. Data collection agencies are encouraged to consider the methods presented here in their administration of traffic data collection programs and to compare the effectiveness of this methodology to the procedures they currently use.

This document provides general guidance on the development of traffic monitoring programs for highway agencies. Its focus is on the collection of traffic volume, vehicle classification, and weight information. The TMG is designed as a reference document. Readers are encouraged to use the Table of Contents to identify sections of interest and to turn directly to those sections. The Executive Summary highlights the most important aspects and recommendations. The main body is organized into six major sections. The contents of sections 2 through 6 are summarized below:

Section 2 introduces the basic parameters that affect the design and operation of traffic counting programs. This section includes a complete description of the variation found in traffic volumes and traffic characteristics, as well as the steps required to account for that variation when summary traffic statistics are developed. Section 2 presents a basic structure for collecting both short-term and continuous traffic data and describes how to use those data to improve the state's knowledge of traffic flow and performance. This material is expanded upon in sections 3, 4, and 5.

Section 2 also discusses the inter-relationships among different aspects of the traffic monitoring system. It discusses how a State can coordinate all aspects of a statewide traffic monitoring program, as well as how to make use of data collected for purposes outside of the traffic monitoring effort. These integration efforts allow a State highway agency to increase the amount of traffic monitoring data available while reducing the overall cost of collecting those data.

Section 3 discusses traffic volume counting. This section focuses on the development of a complete traffic volume counting program, including provision of statistically valid traffic volume estimates and adjustment factors. These estimates are critical to both the reliability of information on traffic volumes and to the computation of many other variables, such as emission estimates, whose calculation are highly dependent on traffic volume estimates. Included in the section are discussions of the federal HPMS reporting requirements, other count programs required by highway agencies, the design of a continuous count program, and the development and application of the adjustment factors needed to meet the needs of each highway agency.

Section 4 covers vehicle classification counts. This section updates previously published federal guidelines for collecting and reporting statewide samples of volumes by vehicle classification. It describes the FHWA vehicle classification categories, describes when other classification schemes should be used, discusses the need for continuous vehicle classification counters, and provides guidance in selecting the appropriate number and location of these counters. Section 4 also gives directions for creating factor groups (and a factor process) that can be used to improve the accuracy of estimates of annual average volume by classification based on short duration counts.

Section 5 presents truck weight data collection information. It discusses the use of weigh-in-motion equipment and describes the reasons for carefully calibrating and managing this type of equipment. This section also updates the recommended sample design process for providing statewide truck weight information and presents reporting ideas that may help States use their truck weight information more effectively.

Section 6 presents the coordinated record formats for station identification, traffic volume, vehicle classification, and truck weight data.

CHAPTER 2 GUIDE OBJECTIVES

Beginning with statewide highway planning surveys of the 1930s, the collection of information on traffic volumes, vehicle types, and truck weights has become a significant portion of the work of highway planning programs in terms of both cost and personnel. Manuals and guides have been issued describing data collection procedures for each type of activity. In the past, each traffic data collection activity was approached as a unique endeavor. Decisions regarding the degree to which each activity should be pursued—for example, number of monitoring sites, duration of monitoring, time or season of year for data collection—have generally been determined by available funding, perceived need for the data, and the size of previous data gathering efforts rather than by a statistical analysis of what monitoring is necessary.

The FHWA has a history of improving the methodologies for monitoring the use of America's highways. In keeping with that history, this document provides guidance for improving traffic counting, vehicle classification, and truck weighing. Beyond simply providing ideas for updating these activities, the guide also provides statistical procedures that will allow the manager to determine how much monitoring is needed to achieve a desired precision level. The TMG and the traffic monitoring framework it describes can be used by all highway agencies, but its primary audience is State highway agencies.

To provide States, Metropolitan Planning Organizations (MPOs), and local highway agencies with information and guidance on monitoring vehicle travel, the guide has three major objectives.

The first objective is to relate the intensity of the monitoring effort to the quality of the information being reported to meet user defined needs. This relationship is achieved through the development of staged program design procedures. The procedures provided allow agencies to assess the ability to meet defined needs in an effective and efficient manner.

The second objective is to change the perception that traffic counting, vehicle classification, and truck weighing are separate activities. Instead, the guide emphasizes the ways in which these activities form a related set of traffic characteristic monitoring functions.

The third objective is to highlight the fact that a considerable number of traffic measurements are being or will be collected for reasons other than traditional traffic monitoring. In many cases, the groups collecting these data are not those traditionally responsible for traffic monitoring. By obtaining data from these non-traditional data sources, it is often possible both to improve the traffic estimates available to users and to reduce the traditional data collection effort in geographic areas covered by these new data sources.

The concept of the direct relationship among volume counts, vehicle classification counts, and truck weight measurements is a unifying element of the guide.

The TMG provides specific recommendations on the number, extent, and duration of monitoring efforts. The design of the data monitoring is set up in an integrated, interrelated, and hierarchical fashion. Truck weighing sessions are designed to provide vehicle classification and volume information, reducing the need for these counts. Vehicle classification counts, in turn, provide volume information. All of these data collection efforts are coordinated with operations, planning, and research efforts within or even outside the State. This “nesting” and coordination of effort leads to economies of operation, improved data availability, and benefits to all concerned.

CHAPTER 3 DATA USES

Traffic data are collected to describe the use and performance of the roadway system. These data are used in a variety of studies. The guide deals with the collection of three specific types of data—volume, vehicle classification, and truck weights—that describe different aspects of the traffic stream. Table 1-3-1 shows examples of the broad range of studies that depend on these types of data. This is not intended as a comprehensive list of data uses but rather is intended to portray the extensive utility of the data.

A variety of other traffic characteristics such as vehicle speeds and vehicle occupancies can also be monitored. These characteristics are not discussed directly within this report. However, activities associated with collecting these data are often a source of traffic volume information. Furthermore, when these additional types of data are required, they must often be reported in the context of traffic volumes and vehicle mix. Therefore, it is important to consider these additional data collection activities when designing the more “traditional” monitoring activities.

Table 1-3-1
Examples of Studies That Use Traffic Characteristics Data

Highway Activity	Traffic Counting	Vehicle Classification	Truck Weighing
Engineering	Highway Geometry	Pavement Design	Structural Design
Engineering Economy	Benefit of Highway Improvements	Cost of Vehicle Operation	Benefit of Truck Climbing Lane
Finance	Estimates of Road Revenue	Highway Cost Allocation	Weight Distance Taxes
Legislation	Selection of Highway Routes	Speed Limits and Oversize Vehicle Policy	Permit Policy for Overweight Vehicles
Maintenance	Selecting the Timing of Maintenance	Selection of Maintenance Activities	Design of Maintenance Actions
Operations	Signal Timing	Development of Control Strategies	Designation of Truck Routes
Planning	Location and Design of Highway Systems	Forecasts of Travel by Vehicle Type	Resurfacing Forecasts
Environmental Analysis	Air Quality Analysis	Forecasts of Emissions By Type of Vehicle	Noise Studies, NOX Emissions
Safety	Design of Traffic Control Systems and Accident Rates	Safety Conflicts Due to Vehicle Mix and Accident Rates	Posting of Bridges for Load Limits
Statistics	Average Daily Traffic	Travel by Vehicle Type	Weight Distance Traveled
Private Sector	Location of Service Areas	Marketing Keyed to Particular Vehicle Types	Trends in Freight Movement