THE HIGHWAY PERFORMANCE MONITORING SYSTEM

U.S Department of Transportation
Federal Highway Administration

The Highway Performance Monitoring System (HPMS)

The transportation needs of our Nation's population, industry, business, and other sectors are constantly changing. Business and industry rely very heavily on efficient and effective highway transportation service. The survival of U.S. business and industry depends on continued, sound highway transportation service to remain competitive in the world market. **The Highway Performance Monitoring System (HPMS) provides essential data on highway conditions, performance, and usage as well as analytical products to the entire transportation community. It's a source for all interested organizations and individuals.**

What is the HPMS?

The HPMS is both a statewide and a national information system that addresses all the Nation's public road mileage. It is a national highway transportation database and analytical simulation system that can serve a variety of users and uses. The HPMS includes limited data on all public roads, summary data, and detailed sample data for rural, small urban, and urbanized areas within a State at known precision levels.

What Purpose Does HPMS Serve?

The HPMS was developed in 1978 to serve highway transportation data and analytical needs at the national level. It replaced numerous uncoordinated annual State data reports as well as biennial special studies conducted by each State, resulting in a reduction in annual State data reporting. Several enhancements have sharpened its focus on timely issues and enhanced analytical tools.

The latest HPMS data-reporting enhancements in 1993 focused on new program requirements mandated by the Intermodal Surface Transportation Efficiency Act of

1991 (ISTEA), the 1990 Clean Air Act Amendments (CAAA), and expanded transportation community data needs. These requirements include, but are not limited to, the National Highway System (NHS), statewide and urban planning, and the travel estimates for National Ambient Air Quality Standards (NAAQS) nonattainment areas.

Analytical tool refinements and the development of HPMS Geographical Information System (GIS) capabilities are being made to fully utilize the recently enhanced HPMS database. Hence, HPMS can serve as an effective element of program activities for States, metropolitan planning organizations (MPOs), and the Environment Protection Agency (EPA). It has served as an essential element of Federal Highway Administration's (FHWA's) program evaluation process for a number of years.

A major purpose of HPMS is to measure and monitor the condition, performance, usage, and operating characteristics of the Nation's highways for use by policy decisionmakers and Congress in developing and evaluating Federal-aid highway programs and funding levels. Additionally, FHWA provides Congress with assessments of future highway investment needs and investment/performance relationships, **using State-furnished HPMS data as input**, for budget and program development purposes.

HPMS Products

- *The Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance*, Biennial Report to Congress
- *Highway Statistics*
  Our Nation's Highways
  Selected Highway Statistics and Charts
- *Highway Safety PerformanceÄFatal and Injury Accident Rates*, Report to Congress
- Policy Planning/Decisionmaking

The HPMS Process

As illustrated in the figure on pages 4 and 5, the Federal Highway Administration, guided by a steering committee consisting of data suppliers, data users, and stakeholders:

- Identifies the HPMS data to be collected.
- Establishes efficient data reporting methods.
- Develops improved analytical techniques.
- Reviews, analyzes, publishes, and disseminates **the State-provided** data.

Collectively, these activities facilitate informed highway planning, policymaking, and decisionmaking at various government levels as well as information to business, industry, and the public.

The State highway agencies (with assistance from local governments and MPOs) collect, edit, assemble, and report the HPMS data to FHWA as specified in the "HPMS Field Manual."

The 1991 ISTEA requires each State to develop and maintain pavement, bridge, safety, congestion, public transportation facilities and equipment, and intermodal transportation facilities management systems, as well as a traffic monitoring system. The HPMS, as redeveloped in 1993, provides congestion-related indicators for use at the national level, uses pavement management systems as the source of pavement-related data, and is closely allied to traffic monitoring.

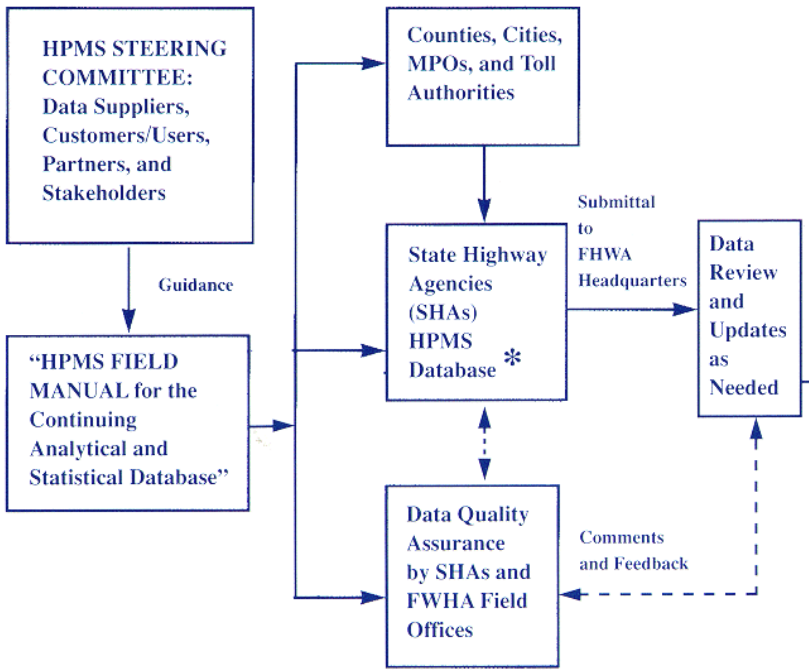
Uses and Applications of HPMS Data

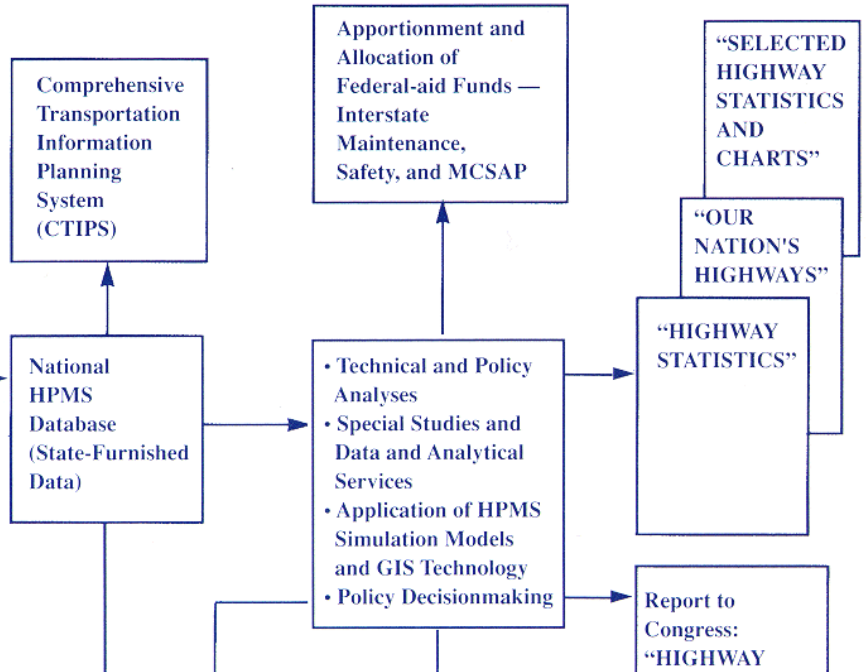
Legislative mandates related to transportation, transportation monitoring programs, and air quality have a direct effect on national data needs, analytical mechanisms, and actions of
States, MPOs, and FHWA. Traditionally, HPMS has been an integral part of policy planning (see following figure).

FHWA HEADQUARTERS

DATA SUPPLIERS AND USERS

FHWA HEADQUARTERS USE: ANALYSES, APPORTIONMENTS, PUBLICATIONS, CONGRESSIONAL REPORTS, AND DATA DISSEMINATION

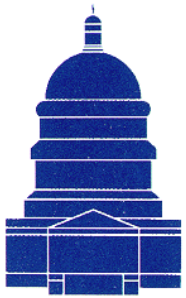




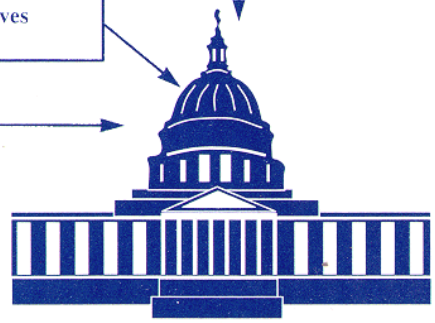
* TYPICAL STATE AND MPO USE

Data and simulation model products are stratified by functional system, by rural, small urban, and each urbanized area (in most cases) within a State.

- Conditions, travel, and performance data by area.
- Annual travel for NAAQS urbanized nonattainment areas — air quality analyses.
- Travel data for Section 134 and statewide planning processes and ISTEA Management Systems.
- State and MPO HPMS Simulation Model Applications to determine future investment needs.



State Legislature



U.S. Congress

As HPMS has matured, so have its uses:

- Apportionment and allocation of Federal-aid funds.
- Policy planning/decisionmaking.
- Development of National Highway System.
- Major database for AASHTO's Comprehensive Transportation Information Planning System (CTIPS).
- Travel by system and area of each State.
- Fatal and injury accident rates.
- Annual travel data for air quality conformity analysis for urbanized areas that are EPA-designated nonattainment areas.
- Simulation model applications: estimates of highway systems deficiencies and accruing investment needs.
- Future GIS maps of the NHS principal arterial and Interstate System configurations and characteristics.
- Development of legislative initiatives.
- Resolution of inquiries, including those of Congress.
- A tool for various assessments/quantifications.

The data collected also support local, State, and Federal transportation officials in adequately planning and administering safe and efficient transportation systems. These data also ensure that proper cost-effective means are being used to rehabilitate and preserve the existing highway transportation infrastructure.

The HPMS database is unique because it directly ties together roadway physical, operational, usage (travel), pavement, condition, and performance data that can be analyzed and summarized at sub-State, statewide, regional, and national levels by highway system. A new GIS capability will greatly enhance the users' ability to analyze and display HPMS data.

The HPMS data are extensively used by various agencies of the Federal, State, and local governments; institutions of higher learning; industry; consultants; professional organizations; the military; and the public.

Apportionment of Federal-Aid Funds to the States

The HPMS data are used for the apportionment and allocation of Federal-aid funds to the States.

- **Interstate System Maintenance Program Funds** are annually apportioned based on lane miles and vehicle travel data.
- **Highway Safety Program Funds** are annually apportioned based on the certified public road mileage and total population data.
- **Motor Carrier Safety Assistance Program Funds** are annually allocated based on statewide public road length and vehicle travel data.

Issues Related to the Transfer of Funds

The ISTEA permits the transfer of 20 percent of each State's Interstate System Maintenance Program funds to other uses. Any portion of the remaining 80 percent can be transferred to other non-Interstate System uses, provided that the Interstate System is maintained properly. Current high-quality HPMS data are essential to FHWA's addressing such fund-transferability issues.

HPMS Simulation Models

The HPMS simulation models include the Analytical Process (AP) and the Highway Economic Requirement System (HERS). The **State-provided HPMS data** are the essential input to these models.

The HPMS simulation models, used extensively for the development of mandated biennial reports to Congress, have the effective capability to:

- Determine accruing deficiencies and needs.
- Simulate future improvements and their costs.
- Investigate the consequences of alternative investment levels and strategies.
- Calculate the potential system's performance and impacts of each strategy.

Analytical tools of this nature are essential to sound, prudent policymaking practices and are paramount for efficient and effective program evaluation and development activities. Model estimates of long-range, highway-investment needs can serve as the basis of future budgets.

On the Horizon

Geographical Information System maps will display current and future HPMS-derived system characteristics by functional system and the proposed NHS. The HPMS GIS capabilities will be used in the data analysis, display, and presentation areas. This new GIS capability will also enhance the exchange of information among Federal, State, and local governments. This is likely to include:

- Review of HPMS data.
- System characteristics/continuity.
- Analytical simulation model results.

HPMS in the Future

As a dynamic, multipurpose information system, HPMS must continue to keep abreast of emerging essential data and analytical needs. Guided by the HPMS Steering Committee, future enhancements will include technological and other advancements to maximize overall program utility, effectiveness, and efficiency at all levels of government. These include:

- Development of highly efficient, stateof-the-art software systems.
- Use of emerging electronic data access, delivery, and dissemination systems.
- Development of electronic publications, including CDROM.
- Data and analytical enhancements to keep abreast of essential needs of the HPMS partnership, including those of the Federal-aid highway program and the stewardship needs of the States and FHWA.

The HPMS continues to be an effective program because of the many contributions of its program partners. Partnership involvement includes decisions concerning data content and utility, software and analytical needs, practicality and workability, and timing of the implementation of enhancements. Our HPMS partners, users, and stakeholders, through representation on the HPMS Steering Committee, play an increasingly active role in shaping the future direction of this essential program to ensure its efficiency and effectiveness during the next decade and beyond.

The HPMS serves many vital highway transportation uses and, as such, requires complete, current, high-quality data. High-quality data is a powerful tool that the entire transportation community cannot afford to lose. **Accountability requires prudent, informed, highway-investment decisions.**