HPMS

Highway Performance Monitoring System

The Federal Highway Administration (FHWA) and every state, beginning in 1978, jointly developed and implemented a continuous data collection system called the Highway Performance Monitoring System (HPMS). Currently, the HPMS contains over 110,000 sample sections segments, the most comprehensive nationwide data system available regarding the physical condition and usage of the nation\'s transportation infrastructure.

The North Carolina portion of the system contains 4800 sample sections. The HPMS database is the primary source of information for the Federal government about the nation\'s highway system. 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 serves a variety of users. The HPMS includes data on public roads, summary data, and detailed sample data for rural, small urban, and urbanized areas within a State.

The provision of data is a cooperative effort among State Highway Agencies, local governments, and metropolitan planning organizations (MPOs) to assemble & report the necessary information. In consultation with the HPMS partnership, the FHWA identifies the data to be collected, establishes efficient collection methods, develops analytical techniques, and analyzes the data. Collectively, these activities facilitate informed highway planning, policy making, and decision making at the national level. Traditionally, HPMS has been an integral part of policy planning, but in the last two decades, there has been increasing use of HPMS by the FHWA in program administration decisions.

The latest HPMS data-reporting enhancements in 1993 focused on new program requirements mandated by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, the 1990 Clean Air Act Amendments, and expanded transportation community data needs. These requirements include, but are not limited to, the National Highway System, 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 underway to fully utilize the recently enhanced HPMS database. HPMS can serve as an effective element of program activities for States, metropolitan planning organizations (MPOs), and the Environmental Protection Agency (EPA). It serves as an essential element of FHWA\'s program evaluation process for a number of years.

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. A new GIS capability will greatly enhance the users\' ability to analyze and display HPMS data. HPMS Analytical models have been modified so that state transportation agencies can use the data to assess the conditions & performance of their own highway systems.

Overview of HPMS Reporting Requirements

Data required for the HPMS reports include 6 major areas:

Areawide Data
Areawide data consists of 5 statewide summaries, including information for travel, system length, accidents, and vehicle classification by functional system and area type, plus land area and population by area type. The area types include rural, small urban, individual urbanized areas and NAAQS non-attainment areas.

Universe Data
The term \'Universe\' refers to a set of data items reported for the entire public road system as individual or grouped length records. The public road system includes those roads owned by State DOT\'s, local Govts, & Federal agencies.

Standard Sample Data
Standard Sample data contains the universe data plus additional data items related to the physical characteristics, condition, performance, use, and operation of the sampled sections of highway. Sample Sections provide detailed information, which is used as the basis for evaluating change over time, and providing the basic input to the HPMS Analytical Process (models).

\'Donut\' Area Sample Data
Donut area samples are unique in that their sole purpose is to enhance the the precision of travel estimates outside of the adjusted urbanized area(s) boundary but within the NAAQS non-attainment areas designated by the Environmental Protection Agency. Consequently, donut sample data items are limited to identification and Annual Average Daily Traffic (AADT).

Linear Referencing System (LRS) data for GIS
The FHWA requires each state to use common HPMS Linear Referencing System components in order to mount the LRS on the National Highway Planning Network (NHPN) for GIS processing. When trying to link any two data systems, common information must exist between them. The common data items used to link the HPMS to the NHPN are: county inventory route number, inventory subroute number, milepoint/kilometerpoint (MPT/KMPT)

In 1996, the FHWA & the GIS Group at the University of Tennessee\'s Transportation Research Center introduced a Linear Referencing System editing program for PCs running Win95/WinNT, named LRSEDIT.

Refer to Chapter 5 of FHWA Order M5600.1B (Aug 30, 1993) for in-depth definitions, discussions, and illustrations of the LRS requirements.

Inventory Route & Node Maps for State & Urbanized Areas
Each year, The NCDOT must prepare & submit to the FHWA a set of printed & digital maps that contain five basic categories of data.

- **Base State highway network**
(rural arterials, urban principal arterials, & other NHS routes)
- **State/County boundaries**
- **Principal Signed Routes**
(Interstates, US Routes, NC Routes)
- **Inventory Route & Subroute numbers**
- **Nodes with node numbers**